

Historic, Archive Document

Do not assume content reflects current scientific knowledge, policies, or practices.

a SD 11
R23

c 3



United States
Department of
Agriculture

Forest Service

Alaska Region
R10-MB-148

August 1991



Starfish Timber Sale, Etolin Island

Final Environmental Impact Statement

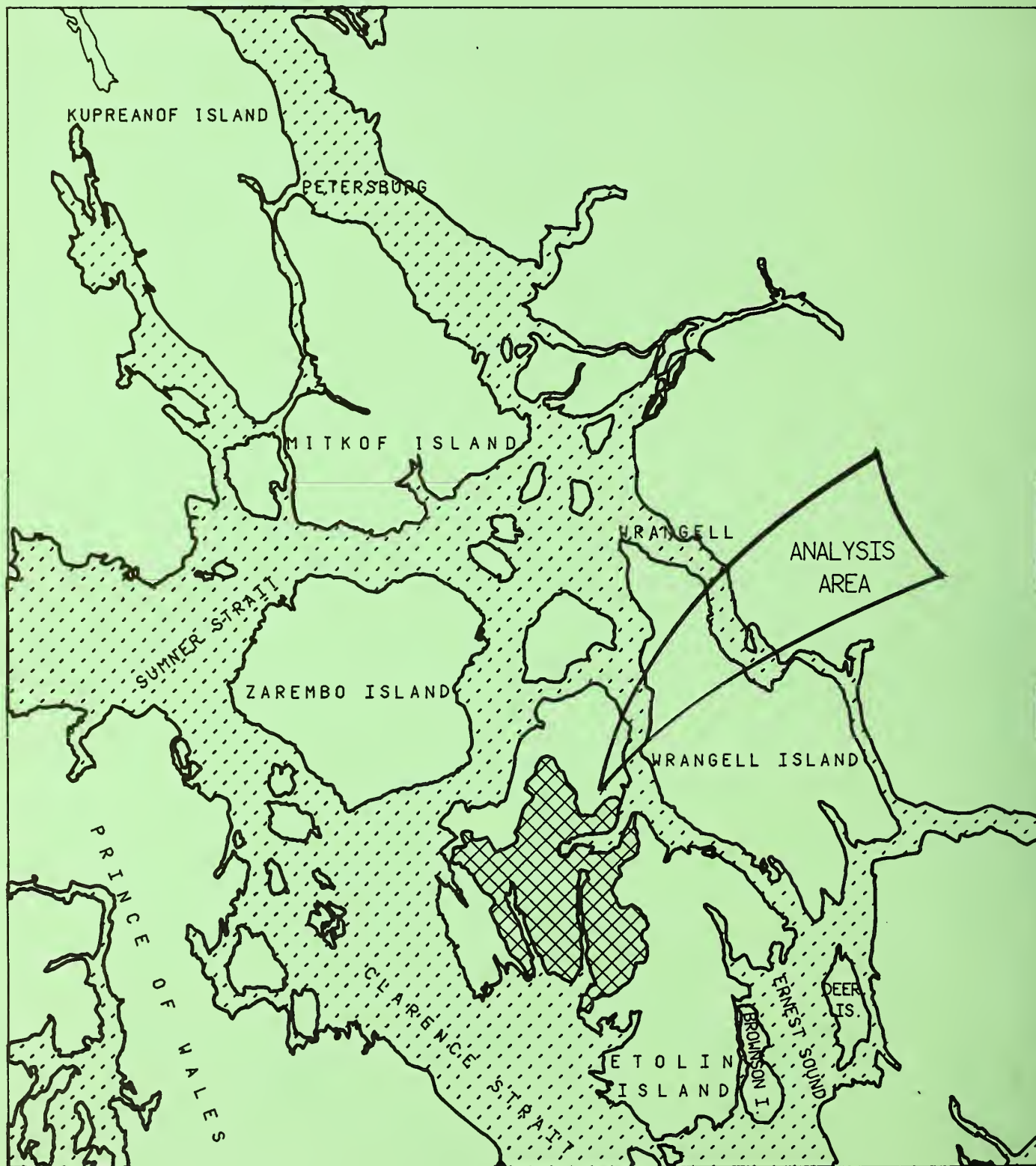
Alaska Region, Stikine Area

OCT 16 1991

LIBRARY



VICINITY MAP OF ETOLIN IS. IMPLEMENTATION ANALYSIS AREA



Final Environmental Impact Statement

Starfish Timber Sale, Etolin Island

U.S.D.A. - Forest Service
Tongass National Forest
Stikine Area
July 1991

Responsible Agency:

*U.S.D.A. Forest Service
P.O. Box 309
Petersburg, Alaska 99833*

Responsible Official:

*Laura L. Nelson
Acting Forest Supervisor
Stikine Area
Tongass National Forest*

*For Further Information
Contact:*

*Richard K. Kohrt
District Ranger
P.O. Box 51
Wrangell, Alaska 99929
(907) 874-2323*

*Appeals Must Be
Received:*

*Within 45 days of the publication date of the
Notice of Record of Decision for the Final
EIS in the Petersburg Pilot. Appeals must be
addressed in writing to Michael A. Barton,
Regional Forester, Federal Office Building,
Box 21628, Juneau, AK 99802-1628.*

Abstract: This Final Environmental Impact Statement describes the impact of four action alternative approaches and one "no action" approach to harvesting timber in the Starfish Timber Sale study area.



Summary

Summary

Introduction

This document is the result of an analysis studying how best to implement the current Tongass Land Management Plan (TLMP) on Etolin Island. This document proposes one or more short-term timber sales designed for independent timber sale operators. Independent short-term timber sales are allowed by the Forest Plan (TLMP) in order to maintain a supply of timber for the independent logging community in southeast Alaska. The analysis area is identified in the Forest Plan as land use designation (LUD) III, managed to "provide a combination of amenity and commodity values", and LUD IV, "for intensive resource use and development where emphasis is primarily on commodity or market resources."

Four action alternatives and a "no action" alternative were considered in this Final EIS. New perspectives concepts were used to varying degrees as design elements in all of the action alternatives.

Issues

The alternatives were developed to address five issues defined by public, state, and other federal agency involvement:

1. Timber Sale Profitability
2. Appropriate Transportation Network
3. Fish Habitat Protection
4. Wildlife Habitat Protection
5. Visual Quality Protection

Alternatives Considered

Alternative 1

This alternative, emphasizing timber economics would harvest approximately 47 million board feet of timber on 1,805 acres. An estimated 24 miles of specified road¹ would be constructed.

Alternative 2

This alternative has a main objective of maximum road development; it would harvest approximately 52 million board feet of timber on 1,992 acres. An estimated 32 miles of specified road¹ would be constructed.

Alternative 3

This alternative is aimed more toward maintaining visual quality and wildlife habitat, and would harvest approximately 44 million board feet of timber on 1,684 acres. An estimated 24 miles of specified road¹ would be constructed.

¹ The location and construction standards of these roads are specified by the Forest Service. Specified roads are sometimes referred to as permanent or system roads.

Summary

- Alternative 4** Emphasizing minimal fragmentation, this alternative would harvest approximately 45 million board feet of timber on 1,720 acres. An estimated 21 miles of specified road would be constructed.
- Alternative 5** The "No Action Alternative" would harvest no timber with no new road construction. Existing conditions would be maintained.
- Helicopter Logging** Helicopter logging is planned for each action alternative in order to provide the opportunity to incorporate group selection with helicopter yarding. To provide an economically feasible helicopter sale, additional helicopter clearcut units have been selected. Helicopter units described as both clearcut and group selection are the same in all of the action alternatives.

Consequences

Each alternative provides a different mix of resource outputs that emphasize different resource values.

- Timber** All of the action alternatives are identified to be marginally profitable, yielding at the mid-market test approximately 20 - 50 percent of normal profit and risk margin.
- Wildlife** All action alternatives would harvest varying amounts of high value wildlife habitat. All alternatives however, defer timber harvesting within a 500-foot strip of beach fringe and within a 1,000 foot buffer around estuaries.
- Fisheries** Several measuring factors are used to compare the risks to fisheries for each alternative. These factors include a combination of the total number of stream crossings, the acres of harvest within fish stream watersheds, and the length of roads and buffered and unbuffered stream channel. All of the alternatives would present some risk. Alternative 2 would pose the greatest potential impact to fisheries because of the number of Class I and II watersheds entered, total existing and proposed road miles, stream crossings, and percent watershed harvest. Alternative 4 would pose the least potential impact to fisheries because of the number of Class I and II watersheds entered and the total existing and proposed road miles, stream crossings, and percent watershed harvest.
- Visual Resources** All of the action alternatives would have visual impacts on viewers travelling in Zimovia Straits, Anita Bay, and the heads of Burnett and Mosman Inlets. Generally, the impacts of the helicopter-logged clearcuts would be fewer than those associated with the cable-yarded units. Fewer roads would be necessary and more vegetation would be left standing after harvest.

Mitigation of Consequences

If an action alternative is selected, the following steps are required:

- (a) The Granite Timber Sale is not scheduled for completion until May 31, 1994. A logging campsite and sort yard are in existence. If requested by contractor, an additional campsite and sort yard could be located for camp housing and sorting logs from the Starfish Timber Sale.

- (b) The Stikine Area management team chose not to use the Olive Cove log transfer facility to implement this project. The Granite Timber Sale is currently scheduled to use the Starfish Cove LTF. This means that to limit conflicts to only two timber sale operators, the entire volume cleared in this EIS would likely be offered as one large timber sale.
- (c) Minimum 330-foot buffers would be maintained around eagle nest trees.
- (d) The wildlife retention areas (combined habitat suitability index greater than or equal to .7*) would be deferred from timber harvesting for all alternatives this planning period.
- (e) All known or discovered cultural sites would be protected. If additional sites are discovered once the sale is in operation, protective measures will be taken as per the timber sale contract provisions.
- (f) Pursuant to the Tongass Timber Reform Act, commercial timber harvesting within a buffer zone no less than one hundred feet in width on each side of all Class I streams and those Class II streams which flow directly into a Class I stream would be prohibited. In addition, stream protection would include provision of buffer areas and other protective actions consistent with aquatic habitat management unit (AHMU) guidelines pertaining to (1) unstable banks, (2) temperature sensitivity, (3) sedimentation, and (4) large, woody debris for rearing habitat, nutrient retention, and streambed stabilization.
- (g) Where deemed necessary, non-fish bearing channels would receive protection, such as removal of all introduced slash to prevent debris loading and subsequent washout (see Unit Descriptions, Appendix B).
- (h) Full bench construction and end hauling of excess excavated material would be required on designated areas for soil stability (see Road Descriptions, Appendix C).
- (i) The visual resource would be protected to the extent required to meet the visual quality objectives for the Etolin analysis area. Boundaries on units have been adjusted to reduce the impact on the view from Anita Bay and Mosman and Burnett Inlet. Landscape design principles would be used in the location and design of rock pits.
- (j) All alternatives are planned to "cause the least adverse impact possible on rural Alaska residents who depend upon subsistence use of the resources of such lands".

Alternative Preferred by the Forest Service

After reviewing all resource impacts, consequences, and opportunities, Alternative 4, the alternative designed for minimal fragmentation, was identified as the preferred alternative.

*Habitat Suitability Index is further explained in the glossary and in the wildlife section of Chapter 3.

Contents

Contents

SUMMARY

I. PURPOSE OF AND NEED FOR ACTION

Introduction	1-1
Purpose of the Project	1-1
Purpose of the Environmental Impact Statement	1-2
Decisions to be Made	1-2
Background	1-2
Analysis Process	1-5
Issues	1-5
Timber Sale Profitability	1-5
Appropriate Transportation Network	1-6
Fish Habitat	1-6
Wildlife Habitat	1-6
Visual Quality	1-6
Opportunities	1-6
Approvals Required From Other Agencies	1-7

II. ALTERNATIVES

Introduction	2-1
Process Used to Formulate Alternatives	2-1
Range of Alternatives	2-2
Alternatives Considered but Eliminated from Detailed Study	2-4
Timber Harvest in SW Mosman and South Burnett Areas	2-4
Alternatives Considered in Detail	2-4
Design Elements Common to Alternatives 1, 2, 3, and 4	2-5
Alternative #1	2-8
Alternative #2	2-13
Alternative #3	2-14
Alternative #4	2-15
Alternative #5	2-16
Unit Size	2-22
Adjacent Units	2-24
Identification of the Forest Service Preferred Alternative	2-25
Mitigation	2-25
Monitoring	2-26
Implementation Monitoring	2-26
Effectiveness Monitoring	2-27
Validation Monitoring	2-28

III. AFFECTED ENVIRONMENT

Introduction	3-1
TLMP Direction	3-1
Forest Plan Revision	3-2

Wildlife	3-2
Threatened, Endangered, or Sensitive Species	3-5
Subsistence	3-5
Harvest Records	3-5
Analysis Method	3-6
Fisheries	3-15
Commercial Fisheries	3-15
Sport Fishery	3-15
Subsistence Fishery	3-15
Enhancements	3-18
Productivity/Escapement	3-18
Temperature Sensitivity	3-19
Fisheries Goals and Objectives	3-19
Standards and Guidelines	3-19
Stream Classification	3-20
Rehabilitation and Enhancement	3-21
Existing Risk	3-22
Recreation	3-23
Recreation Opportunities	3-23
Recreation Places	3-24
Lands	3-28
Minerals	3-29
Cultural Resources	3-30
Visual Resource	3-30
Landscape Character	3-32
Sensitive Viewpoints	3-35
Seen Area	3-35
Visual Quality Objectives	3-35
Visual Management Classes	3-36
Existing Visual Condition	3-36
Soils	3-37
Wetlands and Floodplains	3-38
Watershed	3-38
Drainage Basin Description	3-40
Channel Classification	3-41
Timber	3-45
Employment	3-52
Transportation	3-52
Log Transfer Facilities	3-43
Camps and Administrative Sites	3-43
 IV. ENVIRONMENTAL CONSEQUENCES	
Introduction	4-1
Adverse Environmental Effects Which Cannot be Avoided	4-1
Short-Term Use Versus Long-Term Productivity	4-1
Irreversible Loss of Resources	4-2

Irretrievable Commitment of Resources	4-2
Wildlife	4-2
Habitat Harvested	4-3
Carrying Capacity	4-3
Sitka Black-tailed Deer	4-3
River Otter	4-6
Black Bear	4-6
Marten	4-7
Bald Eagles	4-8
Subsistence	4-8
Large Forested Blocks	4-10
Retention	4-13
Fisheries	4-16
General	4-16
Sedimentation	4-16
Water Temperature	4-16
Large Woody Debris Recruitment	4-16
Buffers	4-17
Risk	4-17
Existing Risk Common to All Alternatives	4-17
Comparison of Alternatives	4-18
Subsistence	4-19
Recreation	4-19
Cumulative Effects	4-19
Cultural Resources	4-20
Cumulative Effects	4-22
Visual Resource	4-22
Consequences Common to All Action Alternatives	4-22
Alternative 1	4-23
Alternative 2	4-24
Alternative 3	4-24
Alternative 4	4-27
Alternative 5	4-27
Cumulative Impacts with Future Entries	4-28
Soils	4-31
Timber Harvest and Soil Hazard Class	4-31
Road Building	4-31
Cumulative Effects	4-32
Wetlands and Floodplains	4-32
Timber Harvest and Wetlands	4-32
Roads and Wetlands	4-32
Floodplains	4-33
Cumulative Effects	4-33
Watershed	4-33
Length of Affected Stream Channels	4-33
Roads and Stream Crossings	4-34
Cumulative Length of Affected Stream Channels	4-34

Cumulative Effects of Roads and Stream Crossings	4-35
Cumulative Proportion of Area Harvested by Watershed	
Sensitivity	4-36
Mitigation Measures	4-41
Timber Economics	4-41
Employment	4-43
Cumulative Effects	4-44
Transportation	4-44
Specified Roads	4-44
Spur Roads	4-44
Cumulative Effects	4-44
Energy Requirements	4-46

V. LIST OF PREPARERS

VI. AGENCIES, ORGANIZATIONS, AND PERSONS TO WHOM COPIES OF THE STATEMENT WERE SENT

VII. GLOSSARY

VIII. INDEX

IX. BIBLIOGRAPHY

APPENDICES

Appendix A	Public Comments and Responses
Appendix B	Unit Descriptions
Appendix C	Road Descriptions
Appendix D	Stream Channel Process Groups
Appendix E	Soil Hazard Classes
Appendix F	Appraisal Worksheets

Maps

Map 1-1	Implementation Analysis Area	3-1
Map 2-0	Adjusted Operable CFL	2-9
Map 2-1	Alternative #1	2-10
Map 2-2	Alternative #2	2-11
Map 2-3	Alternative #3	2-12
Map 2-4	Alternative #4	2-17
Map 2-5	Alternative #5	2-18

Map 3-1	Etolin Island Wildlife Analysis Areas	3-3
Map 3-2	Etolin Island Management Areas	3-4
Map 3-3	Existing Deer Winter Range Values	3-9
Map 3-4	Existing Marten Habitat Values	3-4
Map 3-5	Documented Eagle Nest Trees	3-11
Map 3-6	High Value Wildlife Habitat	3-12
Map 3-7	Fish Streams	3-13
Map 3-8	Inventory R.O.S.	3-25
Map 3-9	Seen and Non-Seen Areas	3-31
Map 3-10	Inventory Visual Quality Objectives	3-32
Map 3-11	Inventory Visual Management Classes	3-33
Map 3-12	Existing Visual Impacts	3-34
Map 3-13	High Hazard Soils	3-39
Map 3-14	Wetlands	3-40
Map 3-15	Watershed Boundaries	3-43
Map 3-16	Stream Network	3-44
Map 3-17	Total CFL	3-47
Map 4-1	Existing Large Blocks of Old Growth	4-11
Map 4-2	Alternative 1 Seen Area	4-25
Map 4-3	Alternative 2 Seen Area	4-26
Map 4-4	Alternative 3 Seen Area	4-29
Map 4-5	Alternative 4 Seen Area	4-30
Map 4-6	Alternative 1 Units in Watersheds	4-37
Map 4-7	Alternative 2 Units in Watersheds	4-38
Map 4-8	Alternative 3 Units in Watersheds	4-39
Map 4-9	Alternative 4 Units in Watersheds	4-40

Tables and Figures

Table 2-1	Development of Adjusted Operable CFL	2-3
Table 2-2	Summary of Consequences	2-2
Table 2-3	Number of acres per unit, by alternative	2-22
Table 3-1	Reduction in Population Levels of MIS (1954 to 1990)	3-7
Table 3-2	ADF&G Numbered Stream Data	3-16
Table 3-3	Summary Comparison of Stream Class Lengths by Stream	3-20
Table 3-4	Temperature-related Fish Mortality	3-22
Table 3-5	Existing Relative Risk to Class I Streams	3-22
Table 3-6	Acres of National Forest Land by ROS Class	3-23
Table 3-7	Recreation Places and Major Activities	3-24
Table 3-8	Permitted Special Uses and Memorandums of Understanding	3-28
Table 3-9	Percent of VCU and Analysis Area in Each VQO	3-36
Table 3-10	Percent of VCU and Analysis Area in Each VMC	3-36
Table 3-11	Distribution of Soil Hazard Classes	3-38
Table 3-12	Distribution of Wetlands	3-38

Table 3-13 . . . Brief Descriptions of Some Watersheds	3-41
Table 3-14 . . . Distribution of Channel Type Process Groups	3-45
Table 3-15 . . . Comparison of Total CFL to Operable CFL Acres by Volume Class and VCU	3-46
Table 3-16 . . . Acres of Operable Old-growth CFL by Volume Class	3-50
Table 3-17 . . . Timber Volume on Operable Old-Growth CFL by Volume Class	3-50
Table 3-18 . . . Existing Forest Development Road by VCU	3-52
Table 4-1 . . . Summary of Acres Harvested by Habitat Type	4-3
Table 4-2 . . . Deer Carrying Capacity	4-4
Table 4-3 . . . Black Bear Carrying Capacity	4-6
Table 4-4 . . . Marten Carrying Capacity	4-7
Table 4-5 . . . Forest Blocks Remaining, by Alternative	4-10
Table 4-6 . . . Estimate of Minimum Old Growth Patch Size Needed	4-13
Table 4-7 . . . Retention Acres	4-14
Table 4-8 . . . Changes of Type of Recreation Opportunity	4-20
Table 4-9 . . . Ground Disturbing Activities	4-20
Table 4-10 . . . Cultural Resource Probability Zones	4-21
Table 4-11 . . . Area Harvested by Soil Hazard Class	4-31
Table 4-12 . . . Total Miles of Road Proposed by Soil Hazard Class	4-31
Table 4-13 . . . Timber Harvest on Forested Wetlands	4-32
Table 4-14 . . . Proposed Road Construction on Wetlands	4-32
Table 4-15 . . . Cumulative Acres of Wetlands Impacted	4-33
Table 4-16 . . . Length of Streams In or Near Proposed Harvest Units	4-34
Table 4-17 . . . Cumulative Length of Streams In or Near Proposed Harvest Units	4-35
Table 4-18 . . . Timber Values and Costs	4-42
Table 4-19 . . . Number and Value of Jobs Generated	4-43
Table 4-20 . . . Some Consequences of the Transportation System	4-46
Table 4-21 . . . Estimated Fuel Consumption by Alternative	4-46
Figure 3-1 . . . Habitat Capability by VCU	3-7
Figure 3-2 . . . Land Base	3-49
Figure 4-1 . . . Fish Risk Factors	4-18
Figure 4-2 . . . Cumulative Watershed Harvest Effects	4-41

Chapter 1

Purpose and Need

Chapter 1

Purpose and Need

Introduction

Need of the Project

Between 1980 and 1989 the Tongass offered 128 million board feet (MMBF) per year to independent timber sale operators. Of the 128 MMBF offered, 101 MMBF was sold and 82 MMBF harvested annually. The Starfish sale has the potential to supply from 36-52% of the timber required to maintain the independent sale industry for one year. The need for this sale by this segment of the industry is critical for the continual supply of timber from public lands.

During the 1980's, industry exhausted the supply of all unsold Stikine Area timber cleared through the National Environmental Policy Act. There is now no timber volume available for out years. The Starfish timber sale has the potential of either meeting the immediate need of industry or supplying future volume when the timber market conditions improve.

Purpose of the Project

The purpose of this project is to provide timber harvest opportunities in one or more timber sales, within an area that includes Anita Bay, Mosman and Burnett Inlets, and Fishtrap Creek drainage. (On all the enclosed maps, the "study area boundary" is the boundary of the analysis area.) This document is the result of an implementation analysis for Etolin Island. The analysis area is located on the Wrangell Ranger District of the Stikine Area, Tongass National Forest. The proposed sale or sales would help fulfill the government's commitment to the timber industry, as provided in the current Tongass Land Management Plan (TLMP). For the following reasons, the Starfish Timber Sale analysis area was selected for a short-term timber sale:

1. It contains an adequate volume of timber on operable, commercial forest land to provide a positive timber sale at mid-market prices;
2. It has been specifically identified in the Forest Plan as land use designation (LUD) III, managed to "provide a combination of amenity and commodity values", and LUD IV, for "intensive resource use and development where emphasis is primarily on commodity or market resources;"
3. It is outside the long-term contract area and has been specifically identified in the Tongass Land Management Plan for management "oriented to the development of short-term sales for the independent logging community;" and
4. It is outside of the South Etolin Wilderness area, recently designated by Congress under the Tongass Timber Reform Act.

The analysis area is located in the Etolin Island Management Area S23, Value Comparison Units (VCU's) 464 (Anita), 467 (Mosman), 468 (Burnett) (see map, p. 3).

1 Purpose and Need

Purpose of the Environmental Impact Statement

The purpose of this Final Environmental Impact Statement (FEIS) is to describe the alternative approaches to harvesting timber in the Starfish timber sale analysis area. It describes the environment that would be affected by the project, discloses the significant environmental consequences of each alternative, and responds to the issues identified in the public scoping process. Finally, it identifies the alternative preferred by the Forest Service and allows the public formal review of the process and approach to selecting a preference.

Decisions to be Made

The environmental impacts documented in this Environmental Impact Statement provide the basis for the following decisions to be made by the Stikine Area Forest Supervisor and documented in the Record of Decision (ROD):

- (a) **How and where should timber sales be scheduled for the analysis area in the immediate future to best address the issues and concerns identified as a result of the scoping process?**
- (b) **Where and how should resource protection constraints suggested by the current Tongass Land Management Plan land allocation be site-specifically identified?**
- (c) **If timber harvest and road construction are to occur, what special measures will be needed to protect resource values for fish, wildlife, recreation, cultural, subsistence and visual quality of the area?**

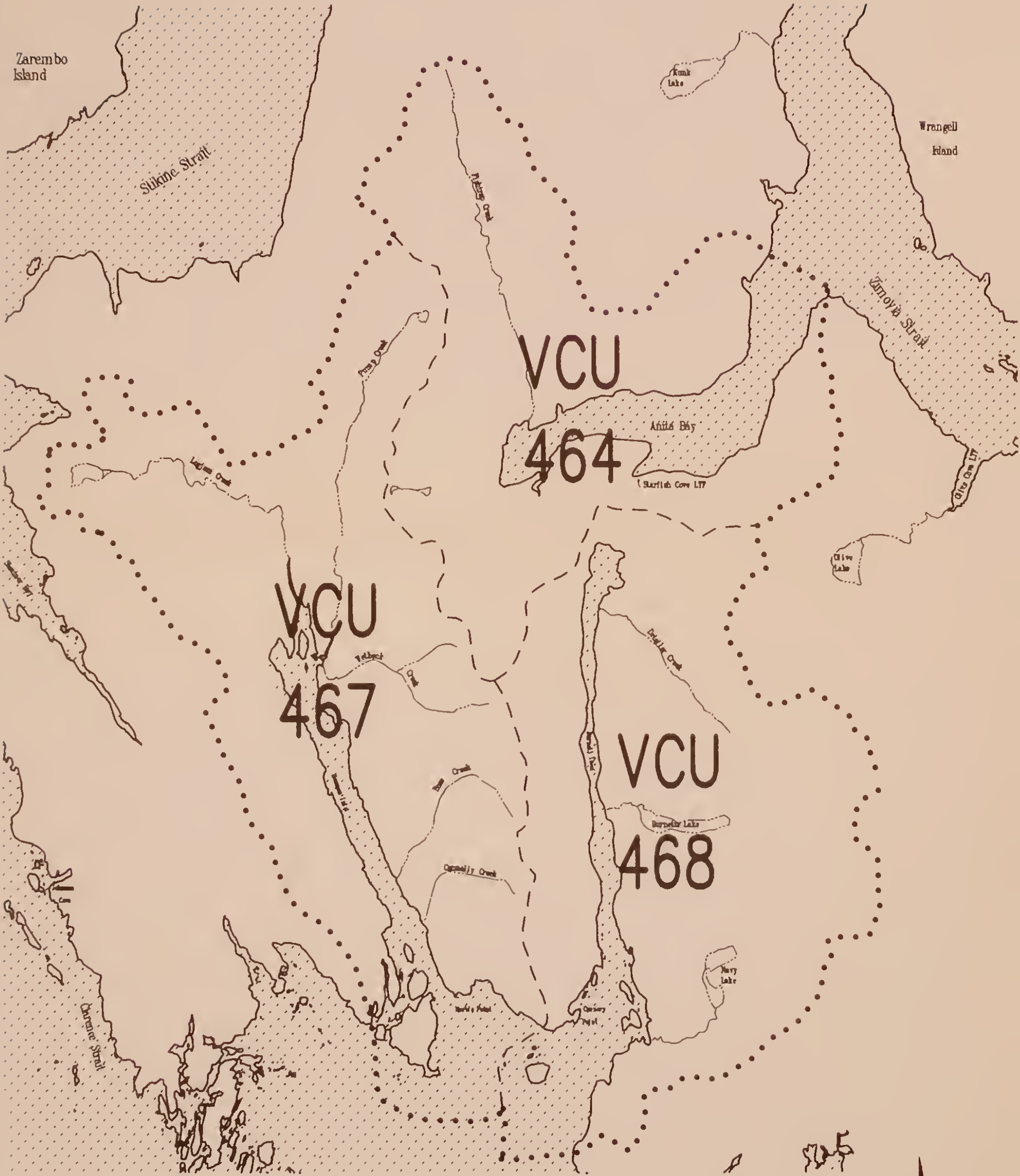
Background

The current Tongass Land Management Plan allocated the Forest into four different mixes of resource use. The Forest was divided into approximately 850 land areas called value comparison units (VCUs), each normally consisting of a major watershed or group of minor watersheds. The degree of development and related resource protection intended was indicated by assigning a land use designation (LUD) to each of the VCUs. Designations range from LUD I, wilderness management, to LUD IV, emphasizing commodity resource development with appropriate environmental constraints.

Timber Sale position papers were developed for Anita, Fishtrap, and Marble Point timber study areas. These papers identified the basic resource outputs of the areas and provided a base for the Final Environmental Impact Statement. A letter of direction was issued and an interdisciplinary study team was formed in August 1987 to begin an area analysis effort. Public involvement in the process started in December 1987, with letters sent to many groups and organizations, notice placed in local papers, and personal contact made with individuals who expressed interest.

The decision to cancel the area analysis on Etolin Island was made in April 1988. The Forest Service determined that the initial Notice of Intent published for the area analysis would be revised because of the significant changes in the analysis approach from one of area analysis that included all of Etolin Island and surrounding islands, to one of a more project-specific implementation analysis for a specified area on Etolin Island. A study plan was completed in December 1989 that initiated a timber sale Implementation Analysis on Etolin Island. The first phase (Phase I) of this implementation analysis was to identify and describe the rationale for selecting the specified location of the analysis area. This Phase I analysis identified the three VCU's discussed in this document for further study.

Starfish Timber Sale Area



LEGEND

- Major Streams
- Study Area Boundary
- Shoreline
- VCU BOUNDARY

MAP SCALE 1:100000



SCALE is 1 INCH = 1.58 MILES



Purpose
and Need
1

Prepared by
a.wilson
15 Jul 91

Analysis Process

Forest Service specialists described the project to the public, beginning with a new scoping period in December 1989. This included letters, a newspaper article, and personal contacts to identify any new public issues or concerns associated with the proposed project.

More recent inventories and data gathering were conducted to supplement those done in 1987 to identify resources and issues. The data was entered into a geographic information system (GIS) that displays resource values such as sensitive stream zones, important wildlife habitat, timber and soil inventories, and location of proposed harvest units.

This information was used to address the issues and analyze the consequences or effects of each alternative and select the alternative preferred by the Forest Service. Unit and road location cards for all alternatives have been used to document the location of proposed harvest units and roads throughout the life of the project. Resource specialists documented their concerns on the unit and road cards and also recommended how their concerns should be treated. The cards convey the planning intent and help track necessary changes in a project when it moves from the planning stage to on-the-ground action. Unit and road descriptions for the preferred alternative can be found in Appendix B and C. These descriptions are not "unit or road cards" but the results of the IDT analysis of those cards at this time. Unit and road cards for all of the action alternatives are located in the planning record.

Inventories, reports, and other pertinent documents are part of the Starfish Timber Sale Implementation Analysis planning record and are available for public inspection at the Stikine Area Forest Supervisor's Office in Petersburg, Alaska.

This Final Environmental Impact Statement is tiered to the current Tongass Land Management Plan (Amended 1986-1987) and the Forest Service's Alaska Regional Guide (November 1983). Tiering means that the FEIS will follow guidance provided in the Forest Plan and the Regional Guide. Relevant portions of those documents, and others, are incorporated into the FEIS by reference.

Issues

Starting in December 1989, the interdisciplinary team (IDT) sent out a revised scoping letter to 42 individuals, 12 businesses, 25 organizations, and 8 municipal, state, and federal agencies. A revised notice of intent to prepare an EIS was published in the Federal Register on December 21, 1989. Responses were received from three agencies, six organizations, one business, and six individuals.

The IDT reviewed these current public comments in addition to the 25 responses received from the initial public scoping conducted during Etolin Island analysis effort in December 1986. These comments were used to identify the issues and concerns that needed to be considered for the proposed timber sales. Alternatives were designed to address the following issues to varying degrees:

1. TIMBER SALE PROFITABILITY

(Issue raised by LP Ketchikan Pulp Company) **Would a timber sale or sales within the Etolin Island Analysis Area meet the economic criteria consistent with that of independent National Forest timber sales?**

Analysis focused on meeting the mid-market test for profitability to industry.

2. APPROPRIATE TRANSPORTATION NETWORK

(Issue raised by LP Ketchikan Pulp Company, and the Olive Cove Homeowners Association) **Would the existing and proposed road network and existing Log Transfer Facility (LTF) at Starfish Cove be sufficient for the proposed project?**

Analysis focused on the proposed and existing road network and LTF, and also on the potential need to tie in the road system with the Olive Cove Road No. 6272 and use the LTF at the mouth of Olive Cove.

3. FISH HABITAT

(Issue raised by several individuals and the Alaska Department of Fish and Game) **How should fish habitat be protected, and what effects would timber harvest and related activities have on fish habitat?**

Indicators of responsiveness to this issue include the miles of fish streams that would have timber harvest close enough to Class I and Class II sections requiring streamside buffers per Tongass Timber Reform Act, and the number of road crossings, miles of road, and percent watershed harvest within fish stream watersheds.

4. WILDLIFE HABITAT

(Issue raised by several individuals and the Alaska Department of Fish and Game) **How should wildlife habitat be protected, and what effects would timber harvest and related activities have on wildlife habitat?**

Management Indicator Species (MIS's), have been identified to reflect the variety of wildlife species indigenous to southeast Alaska. Indicators to watch related to this issue are the percentage of quality habitat remaining, projected population numbers, and the number and size of forested blocks remaining. Analysis included Sitka black-tailed deer, marten, black bear, river otter, and bald eagles.

5. VISUAL QUALITY

(Issue raised by individuals who kayak around Etolin Island) **How should timber management activities be designed to protect visual quality and what effect would activities have on the landscapes of the Etolin Island Implementation Analysis Area, especially as seen from Clarence, Stikine and Zimovia Straits, and from Anita Bay, Mosman and Burnett Inlets?**

Visual Quality Objectives (VQO's) were used to evaluate visual quality. Factors to be considered include visibility, visual variety in the area, and the ability of the area to absorb or mask management activities.

Opportunities

Several resource opportunities were identified during the analysis: (1) the opportunity to incorporate New Perspective concepts within each proposed action alternative, (2) the development of a trail system connecting the Fishtrap Creek area with the alpine areas (Virginia Peak) (3) the tie-in connection with the Olive Cove road system to expand road access (4) potential portage access between Anita Bay and the heads of Burnett and Mosman Inlet via the road system.

Approvals Required From Other Agencies

As the lead agency for this environmental compliance action, the Forest Service is responsible for the preparation of the EIS. The Forest Service will make a decision based on the FEIS, to be documented in a Record of Decision (ROD). The Forest Service is also responsible for acquiring necessary permits from the U.S. Army Corps of Engineers, the Alaska Department of Environmental Conservation, the Environmental Protection Agency, and the Alaska Department of Natural Resources. Each of these agencies will make its own decision about whether to issue the following permits:

- The State easement in Anita Bay (north shore of Starfish Cove) for the facility that includes the loading bulkhead, float and the breakwater has expired. The Forest Service needs to renew this permit, which may require a cadastral survey with special instructions from the State. The Corps of Engineers permit for this facility is still valid as long as the facility is in use.
- The log transfer facility (on the south shore of Starfish Cove), rafting area, and log storage area have valid Corps of Engineer and State easement grant permits. The Environmental Protection Agency and the Alaska Department of Environmental Conservation are not directly involved except through the monitoring requirement.
- Any new facilities, modifications to existing facilities, or actions (such as helicopter yarding to saltwater) in Anita Bay would require actions by the following agencies:
 1. Corps of Engineers permit (404 permit Rivers & Harbors)
 2. Environmental Protection Agency (402 permit)
 3. Alaska Division of Governmental Coordination Review
 4. Alaska Department of Environmental Conservation (certificate)
 5. Alaska Department of Natural Resources (lease or permit)
- A new land based camp location or the use of a floating camp, if requested by the contractor, would require the following permits:
 1. Alaska Department of Environmental Conservation (solid waste permit)
 2. Alaska Department of Environmental Conservation (discharge permit)
- The National Marine Fisheries Service and the US Fish & Wildlife Service were consulted to determine the status of threatened, endangered or sensitive animal and plant species or potential critical habitat for those species within the analysis area.

Chapter 2

Alternatives

Chapter 2

Alternatives

Introduction

This chapter describes alternative methods of providing short-term timber sales for the independent logging industry in southeast Alaska.

Process Used to Formulate Alternatives

Four timber harvest alternatives and a "no action" alternative were developed to respond, in varying degrees, to the issues described in Chapter 1. All of the action alternatives were constructed through the interdisciplinary team (IDT) process to achieve multiple resource objectives within the scope of the project analysis.

***ALTERNATIVE 1** was designed to minimize road building with initial timber harvest entry to maximize present net value while protecting other resource values and conforming with the current Tongass Land Management Plan.

Timber Sale Profitable? Marginal (mid-market test yields approximately 40 percent of normal profit and risk margin).

Appropriate Transportation Network: Minimum road construction. The new road network would be constructed to within 2.0 miles of a junction with the existing Olive Cove road.

Fish Habitat: Appropriate Aquatic Habitat Management Unit (AHMU) requirements, best management practices (BMP's), and Tongass Timber Reform Act buffers would be applied throughout.

Wildlife Habitat: Some high value wildlife habitat harvested.

Visual Resource: Likely to meet inventoried visual quality objectives with mitigation measures incorporated.

***ALTERNATIVE 2** was designed to develop the road network to provide access to the majority of operable commercial forest land (CFL).

Timber Sale Profitable? Marginal (mid-market test yields approximately 20 percent of normal profit and risk margin).

Appropriate Transportation Network: Maximum road construction. The new road network would be constructed to within 0.2 mile of a junction with the existing Olive Cove Road.

Fish Habitat: Appropriate BMP's and AHMU requirements and Tongass Timber Reform Act buffers would be applied throughout.

Wildlife Habitat: Some high value wildlife habitat harvested.

Visual Resource: Likely to meet inventoried visual quality objectives with mitigation measures incorporated.

***ALTERNATIVE 3** was developed to identify viable timber sale opportunities based on visual and wildlife management objectives.

Timber Sale Profitable? Marginal (mid-market test yields approximately 30 percent of normal profit and risk margin).

Appropriate Transportation Network: Minimum road construction. The new road network would be constructed to within 0.9 mile of a junction with the existing Olive Cove Road.

Fish Habitat: Appropriate BMP's, AHMU requirements and Tongass Timber Reform Act buffers would be applied throughout.

Wildlife Habitat: Some high value wildlife habitat harvested.

Visual Resource: Likely to meet inventoried visual quality objectives with mitigation measures incorporated.

***ALTERNATIVE 4** was designed to maintain biological diversity by minimizing entry into large blocks of old-growth timber. This would postpone impacts to old-growth associated species for an extended time. The harvest of operable CFL along the existing road system would be emphasized in order to minimize the construction of new roads.

Timber Sale Profitable? Marginal (mid-market test yields approximately 50 percent profit and risk margin).

Appropriate Transportation Network: Minimum road construction. The new road network would be constructed to within 0.9 mile of a junction with the existing Olive Cove Road.

Fish Habitat: Appropriate BMP's, AHMU requirements, and Tongass Timber Reform Act buffers would be applied throughout.

Wildlife Habitat: Some high value wildlife habitat harvested.

Visual Resource: Likely to meet inventoried visual quality objectives with mitigation measures incorporated.

***ALTERNATIVE 5** (*No Action Alternative*) was designed as the "no-action" alternative, in which no new timber harvest activities would occur. Management of the analysis area would continue as it currently exists.

Timber Sale Profitable? This 36-51 MMBF of Stikine Area's independent sale program would not be available in 1992.

Appropriate Transportation Network: Existing network.

Fish Habitat: No additional risk.

Wildlife Habitat: Maintain existing condition.

Visual Resource: No additional impacts. Allows previously harvested units more time to visually recover before next entry.

Range of Alternatives

The range of alternatives, as a whole, addresses the issues identified in Chapter 1. Each action alternative is consistent with land use designation III and IV guidelines for development in Tongass Land Management Plan.

The volume of timber to be harvested ranges from 36 million board feet (without the helicopter logging) to 52 MMBF, and the no-action alternative describes the effects of choosing not to prepare a timber sale at this time. All of the four proposed action alternatives would harvest 8 MMBF with a helicopter yarding system, with 2 MMBF of this volume included in the helicopter group selection yarding. The number and shape of units varies by alternative.

The alternatives were developed and designed from an "Adjusted Operable CFL" map (see Map 2-0, page 2-9). The first step in developing this map was identifying commercial forest land (CFL is land that can produce at least 8,000 board feet of timber per acre in 100 years). To minimize the hazard of landslides, all the inventoried high hazard soil areas were initially removed from this base. This map excludes from harvest approximately one half of the commercial forest land (CFL) in the analysis area (total CFL is shown on Map 3-17, page 3-47). The IDT then developed a multi-entry layout plan for harvesting the remaining inventoried operable CFL.

Field reconnaissance showed that much of the timber identified in this layout plan was on the border of being non-commercial (less than 8,000 board feet per acre) in addition to being on either high-elevation, unroadable ground or widely scattered among wetlands and riparian areas. This timber was deemed inoperable due to extremely poor economics.

At the same time, after on-the-ground visits, the reconnaissance foresters proposed updating the soil inventory to change the classification of a few high-hazard soil areas to moderate hazard. (See the glossary for a full explanation of the soil hazard types.) The areas in question have been included in the operable CFL base in this document. Field visits by a soil scientist indicated that some areas needed to be reclassified as moderate hazard. In other areas, high hazard soil classifications were confirmed and the units were modified where feasible.

In order to maintain wildlife habitat, the operable CFL was further reduced by removing all timber within 500 feet of the beach and 1,000 feet of estuaries. Additionally, the necessary one hundred foot buffers were added to all Class I and Class II streams. The timbered areas remaining are presented in Map 2-0. All harvest proposals have been developed from within this area referred to as "adjusted operable CFL." Table 2-1 shows the breakdown of the land in the analysis area from which alternatives were developed.

Table 2-1. Development of Adjusted Operable CFL

	VCU 464 Anita	VCU 467 Mosman	VCU 468 Burnett	Analysis Area
Total Land Area	19,187	25,588	22,356	67,131
-Non-Forest Land	-4,558	-3,620	-6,035	-14,213
-Non-CFL	<u>-4,205</u>	<u>-6,221</u>	<u>-2,184</u>	<u>-12,610</u>
Total CFL	10,424	15,747	14,137	40,308
-Inoperable CFL	<u>-5,617</u>	<u>-8,040</u>	<u>-6,733</u>	<u>-20,390</u>
Operable CFL	4,807	7,707	7,404	19,918
-Beach & Estuary Exclusions	<u>-1,089</u>	<u>-1,623</u>	<u>-1,325</u>	<u>-4,037</u>
Adjusted Operable CFL	3,718	6,084	6,079	15,881

Alternatives Considered but Eliminated from Detailed Study

The Forest Service considered a range of alternatives in order to identify a reasonable set to be studied in detail. Those alternatives eliminated from detailed study, along with the rationale for their dismissal, are as follows:

Timber Harvest in SW Mosman and South Burnett Areas

Timber harvest and road construction were analyzed in the areas known as southwest Mosman and south Burnett. These areas, located within the VCU's 467 and 468, are part of the analysis area. These areas would be deferred from timber harvest and road construction this planning period because of several identified major issues and concerns specific to these areas. One issue is the timber profitability and whether a timber sale within these areas requiring separate log transfer facilities and road networks would meet the economic criteria. Also there are fisheries concerns with timber harvesting and road construction south of Burnett Lake and within the Navy Creek drainage.

Alternatives Considered in Detail

The Forest Service developed four alternatives for detailed analysis. Each of these alternatives provides protection for resources; each responds to resource management opportunities such as timber harvest, wildlife habitat management, and visual quality management; and each addresses issues the public and management identified through scoping (see Chapter 1.) However, each alternative provides a different mix of resource outputs, each emphasizing different resource values.

Assuming an action alternative is selected and the Starfish timber sale is implemented, there will likely be some minor changes to the units and roads as they are described in the Final Environmental Impact Statement. It is impossible to put these plans into effect on the ground without responding to conditions that were not anticipated. For example, sometimes this means developing additional protection for a resource value that had not been recognized. Thus all boundaries, acreages, volumes, and road locations should be considered approximations at the time the EIS is published.

Spur roads are not displayed on Maps 2-1 through 2-4 because their locations may change, with Forest Service approval, according to operator needs and equipment requirements. The spur road mileage listed is an estimate of the amount of road a prudent operator may require. (See Appendix B, Unit Description, for an example of spur road location.)

Proposed harvest units displayed in the following maps are intended to show general sizes and locations, and may not reflect the exact shape of proposed units.

Names were used to identify the specific alternatives in the Draft EIS. The interdisciplinary team felt that those names did not adequately describe the alternatives, since they tend to indicate that certain resources carry more emphasis than others. Consequently, the names from the Draft have been dropped in the Final.

**Design Elements
Common to all
Action Alternatives**

Some of the major design elements common to all action alternatives follow:

Standard Elements

Riparian Buffers

Pursuant to the Tongass Timber Reform Act, a 100-foot wide buffer zone is prescribed on each side of all Class I streams and on those Class II streams which flow directly into Class I streams.

Unit Shaping

Harvest units on the south side of Anita Bay visible from Zimovia Strait would be designed to imitate the shapes of natural slides or chutes.

Roads and Rock Pits

Roads on the south side of Anita Bay would take maximum advantage of natural slope breaks to reduce their visibility. In sensitive viewsheds, rock pits would be placed outside of harvest units and screened by trees whenever possible.

Log Transfer Facility (LTF) and Direct to Saltwater Helicopter Yarding Booming and Rafting Areas.

The existing Starfish Cove LTF and rafting area will be used by all the alternatives for the hauling and dumping of all roaded timber harvest volume. In addition, the booming and rafting areas for the timber volume helicopter-yarded directly to saltwater will be the same for all alternatives.

Helicopter Logging

<u>Helicopter Clearcut</u>	<u>Helicopter Group Selection</u>
<i>6 MMBF timber</i>	<i>2 MMBF timber</i>
<i>251 acres land</i>	<i>69 acres land</i>
<i>no additional road</i>	<i>no additional road</i>

Helicopter logging was considered in each of the Starfish action alternatives in order to provide the opportunity to incorporate group selection (removal of trees in groups of 3 acres or less) with helicopter yarding. To provide an economically feasible helicopter sale, additional helicopter clearcut units have been selected.

There would be no need to construct additional road. Helicopter-yarded volume will be yarded either directly to saltwater or to new or existing roaded landings.

Helicopter units described as both clearcut and group selection are the same in all of the action alternatives even though their unit numbers are different.

New Perspective Elements

Etolin Island was selected as a prototype area to develop and implement the concepts of New Perspectives. New Perspective is a pathway for achieving a full array of values and benefits, with increased emphasis on fisheries, wildlife, recreation, ecological sustainability, and long-term productivity. Below are the New Perspective concepts common to the design of each of the timber harvest alternatives.



*Old Growth in
Study Area Vicinity*



Internal Exclusions

Large old-growth trees within the harvest unit will be left to achieve structural diversity and to visually screen roads and modify blocky unit shapes. These are silviculturally referred to as "internal exclusions" for green tree retention. Because of the current limitation of high lead cable yarding, opportunities for retaining these groups, ranging from one to six acres, are limited to small groups left between cutting settings. Unit description maps in Appendix B show where these groups of trees are planned in sample units.

Group Selection

One component of New Perspectives is a broadened view of possible harvest and yarding techniques to better achieve resource objectives in a more ecologically sensitive manner.

The group selection prescription would be applied in areas of moderate to high visual sensitivity. Small groups one-half to 3 acres in size, ranging from 200 to 400 feet in diameter, will be harvested using helicopter yarding either directly to saltwater or to a road landing. Approximately 10 to 15 percent of the viewshed would be removed. Visual impacts would be minimal due to small size, and the small group selection would more closely resemble the natural forest in southeast Alaska. Impacts to wildlife habitat would be similar to that occurring naturally.

The following specific guidelines would be followed in picking timber for the group selection harvest areas.

- Trees selected would not be over 50" in diameter.
- Group selection would not exceed a size of 3 acres.
- Areas would not be located near V-notches.
- Selection areas would be no closer than 300' apart.
- All Class I and II streams would have minimum 100' buffers.
- Selection areas would have a shape and location designed to minimize windthrow. They should be randomly distributed and mimic natural shapes (slides, windthrow, etc. in the surrounding landscape.
- Cedar would be the preferred selection species.
- Selection units would be a minimum of 500' from saltwater.

Specific information for each group will be included on the unit cards.

Maintenance of Large Blocks of Old Growth

One of the major analyses undertaken was to evaluate old-growth stand conditions and patterns over the entire 67,131 acre analysis area. Most of the timber stands in the area are old growth more than 200 years old. Most of the harvested stands are less than 25 years old and the oldest immature stands are approximately 75 years old. All the alternatives incorporated to varying degrees the concept of minimizing entry into large, interconnected blocks of old-growth habitat. This would offer a wider range of landscape management options in the future.

Public Input and Participation

Another component of New Perspective is public input and participation. The Starfish implementation analysis effort was presented at the Regional New Perspective Workshop (July 1990). Other individuals and agencies outside the Forest Service have been solicited for their comments and input. Responses to the Draft Environmental Impact Statement have been included in this FEIS, and answers to questions raised and points made in those responses have been included. Additionally, a subsistence hearing in accordance with Section 810 of ANILCA was held, and testimony from that hearing is included in this FEIS.

Retention of High Value Wildlife Habitat within Beach Fringe and Estuaries

Wildlife resource inventory maps were generated using Habitat Capability computer models to evaluate habitat quality, size, and juxtaposition throughout the analysis area. The highest quality overall wildlife habitat was identified by generating a mean wildlife HSI (Habitat Suitability Index) using the individual HSI values of the 5 project management indicator species: bald eagle, Sitka black-tailed deer, black bear, marten, and river otter. All areas with an average HSI of 0.7 or greater were removed from consideration during this project analysis. In general this area consisted of most habitats occurring within a 500' beach fringe buffer and a 1,000' estuarine fringe buffer as well as some selected high quality riparian areas. Avoidance of these habitats in all alternatives resulted in a remaining continuous corridor of high quality habitat extending along the beach fringe throughout the analysis area.



Willow

Alternative #1

ALL LOGGING SYSTEMS

46 MMBF timber
1,798 harvest acres
24 miles specified¹ road
2 miles spur² road

CABLE LOGGING SYSTEMS

38 MMBF timber
1,478 harvest acres

HELICOPTER LOGGING SYSTEMS

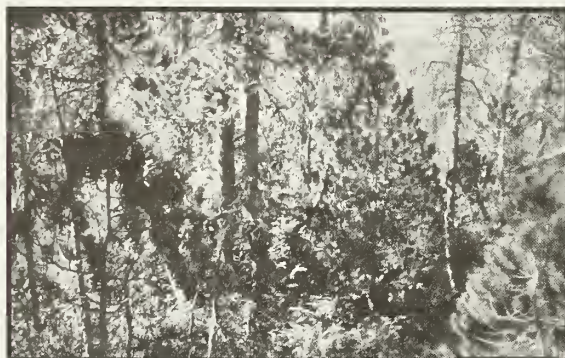
8 MMBF timber
320 harvest acres

Timber. Alternative 1 would harvest 12 percent of the adjusted operable CFL. The 39 MMBF of cable yarding is harvested at a rate of 1.7 MMBF/mile of new specified road. Alternative 1 leaves approximately 30 MMBF uncut along the new and existing road system. This timber can be harvested in the future with no further road building. The helicopter logging units within this alternative are the same for Alternatives 2, 3, and 4. They consist of helicopter clearcut yarding units and group selection yarding units. Map 2-1, opposite, displays the unit locations, LTF, and specified road system as designed.

Visual Resource. Alternative 1 would have a visual impact on Anita Bay, Zimovia Straits, the head of Burnett Inlet, and the head and eastern side of Mosman Inlet. This alternative has potential to create a visual condition of "maximum modification" in Detailer Creek and along the east side of Mosman Inlet, but would likely meet inventory visual quality objectives elsewhere.

Fisheries. This alternative would designate harvest and/or roadbuilding activities in 12 of the 22 Class I fish stream watersheds and 3 of the 8 Class II fish stream watersheds in the analysis area. Within these watersheds, 16 miles of new road would be built requiring 27 stream crossings to harvest 1,485 acres of timber with 4 miles of stream buffer.

Wildlife. Alternative 1 would harvest a moderate amount of high value wildlife habitat (see Map 3-6, page 3-12).



Muskeg Fringes

¹ The location of the road and the construction requirements are specified by the Forest Service. Specified roads are sometimes referred to as permanent or system roads.

² Spur roads are designed for short term project needs to provide access between harvest units and specified roads. Spur roads are sometimes referred to as temporary or non-system roads.

Map 2-0. Adjusted Operable CFL



STARFISH TIMBER SALE FEIS

LEGEND

- Major Streams
- Study Area Boundary
- Shareline
- Planned Roads
- Existing Roads

- Adjusted Operable CFL
- Existing Clearcuts

MAPSCALE 1:100000



SCALE is 1 INCH = 1.58 MILES



Map 2-1. Alternative 1



LEGEND

- Major Streams
- Study Area Boundary
- Shoreline
- Planned Roads
- Existing Roads
- Proposed Cable Units
- Proposed Helicopter Units
- Proposed Group Selection Areas
- Existing Clearcuts

MAPSCALE 1:100000



SCALE is 1 INCH = 1.58 MILES



Map 2-2. Alternative 2



LEGEND

- | | |
|---------------------|--------------------------------|
| Major Streams | Propased Cable Units |
| Study Area Baundary | Propased Helicopter Units |
| Shoreline | Propased Graup Selection Areas |
| Planned Raads | Existing Clearcuts |
| Existing Roads | |

MAPSCALE 1:100000



SCALE is 1 INCH = 150 MILES

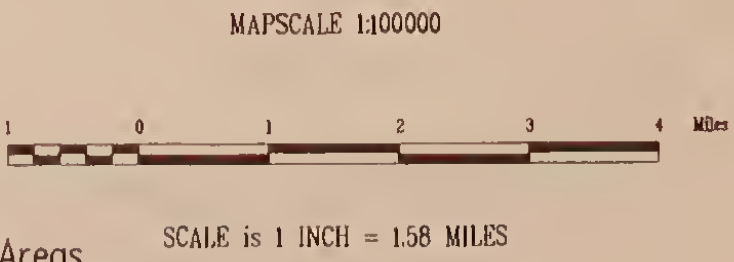
Prepared by
a.wilson
10 Jul 91

Map 2-3. Alternative 3



LEGEND

- | | |
|---------------------|--------------------------------|
| Major Streams | Proposed Cable Units |
| Study Area Boundary | Proposed Helicopter Units |
| Shoreline | Proposed Group Selection Areas |
| Planned Roads | Existing Clearcuts |
| Existing Roads | |



Alternative #2

ALL LOGGING SYSTEMS	CABLE LOGGING SYSTEMS	HELICOPTER LOGGING SYSTEMS
51 MMBF timber 1,954 harvest acres 32 miles specified ¹ road 3 miles spur ² road	43 MMBF timber 1,634 harvest acres	8 MMBF timber 320 harvest acres

Timber. Alternative 2 would harvest 14 percent of the adjusted operable commercial forest land. Map 2-2, opposite, displays the unit locations, log transfer facilities, and specified road system as designed. This alternative provides for the most timber and constructs the most new road of all the alternatives. The helicopter yarding is the same as in the other alternatives. Road 6272 will be extended to within 0.2 mile of connecting to the Olive Cove system.

The 44 MMBF of cable yarding is harvested at a rate of 1.4 MMBF/mile of new specified road. Alternative 2 leaves approximately 46 MMBF along the new and existing road system. This timber can be harvested in the future with no further road building. This provides for the best economics of future timber sales in the analysis area. The helicopter logging units within this alternative are the same for Alternatives 1, 3, and 4. They consist of helicopter clearcut yarding units and group selection yarding units.

Visual Resource. Alternative 2 would visually affect Anita Bay, Zimovia Straits, the head of Burnett Inlet, the head and eastern side of Mosman Inlet, and Marble Point. This alternative has potential to create a visual condition of "maximum modification" in Wetbeck Creek and along the east side of Mosman Inlet, but would likely meet inventory visual quality objectives elsewhere.

Fisheries. In Alternative 2, 16 of the 22 Class I fish stream watersheds, and 3 of the 8 Class II fish stream watersheds would have potential impacts. Within these watersheds, this alternative would construct 21 miles of road requiring 37 stream crossings to harvest 1,672 acres with 5 miles of stream buffer.

Wildlife. Alternative 2 would harvest the greatest amount of high value wildlife habitat.

¹ The location of the road and the construction requirements are specified by the Forest Service. Specified roads are sometimes referred to as permanent or system roads.

² Spur roads are usually less than 1/2 mile long. The location is selected by the contractor and approved by the Forest Service. Spur roads are sometimes referred to as temporary or non-system roads.

Alternative #3

ALL LOGGING SYSTEMS	CABLE LOGGING SYSTEMS	HELICOPTER LOGGING SYSTEMS
44 MMBF timber 1,671 harvest acres 25 miles specified ¹ road 2 miles spur ² road	36 MMBF timber 1,351 harvest acres	8 MMBF timber 320 harvest acres

Timber. Alternative 3 would harvest 11 percent of the adjusted operable CFL. Map 2-3, opposite, displays the unit locations, LTF, and specified road system as designed. There would be one unit exceeding the 100-acre size limit described in the National Forest Management Act. The larger unit, however, is less than 150 acres, the maximum size that can be approved by a Forest Supervisor. The 36 MMBF of cable yarding is harvested at a rate of 1.4 MMBF/mile of new specified road. Alternative 3 leaves approximately 25 MMBF along the new and existing road system. This timber can be harvested in the future with no further road building. The helicopter logging units within this alternative are the same for Alternatives 1, 2, and 4. They consist of helicopter clearcut yarding units and group selection yarding units.

Visual Resource. Alternative 3 would have visual impacts on Anita Bay, Zimovia Straits, the head of Burnett Inlet and the head of Mosman Inlet. This alternative would likely meet inventory VQO's in each of these areas.

Fisheries. Timber harvest and/or roadbuilding would occur in 11 of the 22 Class I fish stream watersheds, and 2 of the 8 Class II fish stream watersheds of the analysis area. The 16 miles of road which would be constructed in these watersheds would require 26 additional stream crossings to provide access to 1,364 harvest acres having 2 miles of stream buffers.

Wildlife. Alternative 3 harvests less high value wildlife habitat than Alternative 1 or 2.

¹ The location of the road and the construction requirements are specified by the Forest Service. Specified roads are sometimes referred to as permanent or system roads.

² Spur roads are usually less than 1/2 mile long. The location is selected by the contractor and approved by the Forest Service. Spur roads are sometimes referred to as temporary or non-system roads.

Alternative #4 Forest Service preferred alternative

ALL LOGGING SYSTEMS	CABLE LOGGING SYSTEMS	HELICOPTER LOGGING SYSTEMS
44 MMBF timber 1,701 harvest acres 21 miles specified ¹ road 3 miles spur ² road	36 MMBF timber 1,381 harvest acres	8 MMBF timber 320 harvest acres

Timber. Alternative 4 would harvest 12 percent of the adjusted operable CFL. Map 2-4, opposite, displays the unit locations, LTF, and specified road system as designed. The 37 MMBF of cable yarding is harvested at a rate of 1.7 MMBF/mile of new specified road. Alternative 4 leaves less timber than any of the others--approximately 22 MMBF uncut along the new and existing road system. This timber can be harvested in the future with no further road building. The helicopter logging units within this alternative are the same for Alternatives 1, 2, and 3. They consist of helicopter clearcut yarding units and group selection yarding units.

Visual Resource. Alternative 4 would have visual impacts on Anita Bay, Zimovia Straits, the head of Burnett Inlet and the head of Mosman Inlet. This alternative has potential to create a visual condition of "maximum modification" in Wetbeck drainage and along the south side of Anita Bay, but would likely meet inventory visual quality objectives elsewhere.

Fisheries. Harvest and/or roading would occur in 11 of the 21 Class I fish stream watersheds, and 1 of the 8 Class II fish stream watersheds of the analysis area. Within these watersheds, 15 miles of road would be constructed requiring 22 additional stream crossings to provide access to 1,400 harvest acres having 2 miles of buffers.

Wildlife. Alternative 4 harvests the least amount of high value wildlife habitat.

¹ The location of the road and the construction requirements are specified by the Forest Service. Specified roads are sometimes referred to as permanent or system roads.

² Spur roads are usually less than 1/2 mile long. The location is selected by the contractor and approved by the Forest Service. Spur roads are sometimes referred to as temporary or non-system roads.

Alternative #5

No Action Alternative

ALL LOGGING SYSTEMS

0 MMBF timber
0 harvest acres
0 miles specified road
0 miles spur road

CABLE LOGGING SYSTEMS

0 MMBF timber
0 harvest acres

HELICOPTER LOGGING SYSTEMS

0 MMBF timber
0 harvest acres

Timber. Alternative 5 was evaluated to assess the impact of allowing the current management in the area to continue without a timber sale, and to provide baseline information against which other alternatives would be measured. There would be no additional road construction or no additional timber harvest. Currently there is approximately 4 MMBF uncut along the existing road system.

Visual Resource. Alternative 5 would retain the analysis area in its present visual condition. Existing clearcuts seen from Anita Bay, the head of Burnett Inlet, and the head of Mosman Inlet would have more time to visually recover before the next entry.

Fisheries. No new entries would be made into Class I or Class II fish stream watersheds.

Wildlife. Alternative 5 maintains the existing high value wildlife habitat in its present condition.

Map 2-4. Alternative 4



LEGEND

- | | |
|---------------------|--------------------------------|
| Major Streams | Proposed Cable Units |
| Study Area Boundary | Proposed Helicopter Units |
| Shoreline | Proposed Group Selection Areas |
| Planned Roads | Existing Clearcuts |
| Existing Roads | |

MAP SCALE 1:100000



SCALE is 1 INCH = 158 MILES



Map 2-5. Alternative 5



LEGEND

- Major Streams
- Study Area Boundary
- Shoreline
- Existing Roads
- Existing Clearcuts

MAPSCALE 1:100000



SCALE is 1 INCH = 1.58 MILES



Table 2-2. Summary of Consequences

ELEMENT OF PROPOSAL	ALT 1	ALT 2	ALT 3	ALT 4	ALT 5
TIMBER HARVEST					
Total volume (MMBF) (Inc. heli. logging)	46	51	44	44	0
Area harvested:					
Acres proposed	1,798	1,954	1,671	1,701	0
Cumulative acres	3,284	3,440	3,657	3,187	1,486
Total commercial forest land (CFL) (out of 40,308 acres)					
Percent proposed	5	5	4	4	0
Cumulative percentage	8	9	8	8	4
Adjusted operable CFL (out of 15,881 acres)					
Percent proposed	11	13	11	11	0
Cumulative percentage	21	22	20	20	10
Standard adjusted operable CFL (can be harvested with standard cable logging systems)					
Acres proposed	1,485	1,672	1,364	1,400	0
Cumulative acres	2,996	3,183	2,875	2,911	1,511
(out of 8,956 acres)					
Percent proposed	17	19	15	16	0
Cumulative percentage	33	36	32	33	10
Non-standard adjusted operable CFL (requires helicopter)					
Acres proposed	320	320	320	320	0
Cumulative acres	320	320	320	320	0
(out of 6,925 acres)					
Percent proposed	5	5	5	5	0
Cumulative percentage	5	5	5	5	0
Units over 100 acres	1	0	1	1	0
ROAD CONSTRUCTION					
Miles of specified road construction	24	32	25	21	0
Miles of spur road construction	2	3	2	3	0

2 Alternatives

Table 2-2. Summary of Consequences (continued)

ELEMENT OF PROPOSAL	ALT 1	ALT 2	ALT 3	ALT 4	ALT 5
VISUAL RESOURCE					
Percent of the proposed activities likely to be seen	62	64	54	46	0
(Note: 80 percent of the available operable CFL is seen from visually sensitive travel routes. If VQO's are to be met with harvest activities, within-stand leave trees and unit shaping are needed)					
WATERSHED SENSITIVITY					
Number of watersheds affected this entry	22	27	23	19	0
Number of ADF&G watersheds whose cumulative harvest area is within 10 percentage points of Threshold of Concern (TOC) or greater	4	4	4	4	3
Number of ADF&G watersheds whose cumulative harvest area meets or exceeds the TOC	2	2	2	2	2
Number of ADF&G watersheds with threshold concerns affected in this entry	0	0	0	1*	0
WATER QUALITY/FISH HABITAT					
Buffered fish streams					
proposed	4	5	2	2	0
cumulative	6	7	4	4	2
Nonbuffered streams					
proposed	1	1	1	0	0
cumulative	7	7	7	6	6
Number of stream crossings					
proposed	27	37	26	22	0
cumulative	62	72	61	57	35
Miles of road within fish stream watersheds					
proposed	16	21	16	15	0
cumulative	42	47	42	41	26
Percent of fish stream watershed harvest					
proposed	6	5	5	6	0
cumulative	11	10	10	11	5

*Watershed Q19C affected by additional harvest of 2 acres.

Table 2-2. Summary of Consequences (continued)

Carrying Capacity	Original	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Deer	1,334	1,206(10%)*	1,196(10%)	1,198(10%)	1,212(9%)	1,295(3%)
Marten	163	148 (9%)	147 (10%)	150 (8%)	149 (9%)	155 (5%)
Eagle	101	86 (15%)	88 (13%)	88 (13%)	88 (13%)	89 (12%)
Otter	59	55 (7%)	55 (7%)	55 (7%)	55 (7%)	56 (5%)
Black Bear	117	114 (3%)	114 (3%)	114 (3%)	114 (3%)	114 (3%)
* Numbers in parentheses are percent decline over original condition						
Average Size of Large Forested Block Maintained (acres)		2,710	2,500	3,110	3,220	3,390

ELEMENT OF PROPOSAL	ALT 1	ALT 2	ALT 3	ALT 4	ALT 5
SUBSISTENCE					
Extent of Impact on Subsistence Use (none/minor/major/significant)	minor	minor	minor	minor	none
EMPLOYMENT					
Number of Jobs Generated	329	364	308	315	0
Dollar Value of Jobs (\$ million)	11.0	12.1	10.3	10.5	0
Dollar Value Secondary (\$ million)	77.0	84.78	72.09	73.50	0
NET STUMPAGE (\$/MBF)	14	-7	5	19	0

2 Alternatives

Unit Size

The action alternatives have units of varying size and number. Table 2-3 displays, for each action alternative, the unit number and its corresponding number of acres. Many of the units are the same from one alternative to the next, though they have different identifying numbers. Those clearcut units which are greater than 100 acres in size must be specifically reviewed by the forest supervisor. Those greater than 150 acres are subject to review by the regional forester.

Some of the units would be harvested by helicopter group selection, where approximately 10 to 15 percent of the acres shown in the unit would be cut in groups not exceeding 3 acres. These are indicated by HG following the unit number on the table. The clearcut units that will be yarded with a helicopter have an H following the unit number. A dash (--) in the column indicates that the unit is not part of the alternative displayed in that column.

Table 2-3. Number of acres per unit, by alternative.

ALT 1		ALT 2		ALT 3		ALT 4	
Unit #	Acres	Unit #	Acres	Unit #	Acres	Unit #	Acres
--	--	201	35	--	--	--	--
--	--	202	28	301	70	401	139
--	--	--	--	302	48	--	--
101	66	203	66	303 & 304	31	402	89
102	15	--	--	--	--	--	--
103	18	204	18	305	46	403	53
104	25	205	25	306	25	404	25
105	27	--	--	--	--	--	--
114	94	211	70	70	70	405	94
106	17	206	17	--	--	--	--
115	31	212	31	312	31	406	31
107	13	207	13	307	13	--	--
--	--	213	48	314	48	407	48
108	11	--	--	308	11	--	--
--	--	214	31	313	31	408	31
109	33	208	33	309	33	--	--
--	--	215	44	316	64	409	87
110	36	--	--	--	--	--	--
--	--	--	--	315	92	410	110
111	74	209	74	--	--	--	--
112	61	210	61	--	--	--	--
--	--	--	--	310	129	--	--
116	38	218	38	319	38	411	38
117	65	219	65	320	65	412	65
118	17	220	17	321	17	413	17
119	16	221	16	322	16	414	16
120	26	--	--	323	26	415	26
121	18	224	18	324	18	416	18
--	--	222	36	325	36	417	36
122 & 123	63	223 & 225	63	--	--	418	73

Table 2-3. Number of acres per unit, by alternative. (continued)

ALT 1		ALT 2		ALT 3		ALT 4	
Unit #	Acres	Unit #	Acres	Unit #	Acres	Unit #	Acres
124	112	--	--	326 & 327	85	419	73
--	--	--	--	--	--	420	--
125	78	226	78	328	78	421	98
--	--	--	--	--	--	422	13
127	48	227	48	329	48	423	48
128	37	228	37	--	--	--	--
--	--	--	--	--	--	424	46
--	--	229	34	--	--	--	--
129	46	--	--	--	--	425	46
130	46	--	--	330	46	426	46
131	39	230	39	331	33	--	--
132	20	231	20	--	--	--	--
133	40	232	40	--	--	--	--
134	45	233	45	--	--	--	--
135	94	234	94	--	--	--	--
--	--	216	57	317	57	--	--
--	--	217	39	318	39	--	--
--	--	235	94	--	--	--	--
--	--	236	69	--	--	--	--
--	--	237	50	--	--	--	--
--	--	238	61	--	--	--	--
--	--	239	38	--	--	--	--
136HG	182	240HG	182	332HG	182	427HG	182
137HG	16	241HG	16	333HG	16	428HG	16
138HG	36	242HG	36	334HG	36	429HG	36
139H	29	243H	29	335H	29	430H	29
140H	27	244H	27	336H	27	431H	27
141H	23	245H	23	337H	23	432H	23
142H	98	246H	98	338H	98	433H	98
143H	38	247H	38	339H	38	434H	38
244H	47	248H	47	340H	47	435H	47
145HG	97	249HG	97	341HG	97	436HG	97
146HG	45	250HG	45	342HG	45	437HG	45
147HG	85	251HG	85	343HG	85	438HG	85

2 Alternatives

Adjacent Units

A number of harvest units in the Starfish timber sale are adjacent to existing cutting units of previous sales. These particular units were chosen in order to avoid impacts to Detailer Creek, and to meet the objective of minimizing fragmentation in the forest. By the time these units are harvested, tree regeneration in all but one of the adjacent units should have reached a height of over 5 feet. Table 2-4 displays these adjacent cutting units, along with their sizes. Their current growth condition is listed below.

Table 2-4. Units from Granite timber sale that are adjacent to Starfish timber sale harvest units.

	Starfish Unit number	Acres	Adjacent to Granite unit #	Acres	Total Opening Acres
Alt. 1	145	97	3	66	163
	115	46	5	94	140
	130	46	9	98	144
Alt. 2	249	97	3	66	163
	212	46	5	94	140
Alt. 3	341	97	3	66	163
	312	46	5	94	140
	331	33	9	98	131
Alt. 4	436	97	3	66	163
	406	31	5	94	125
	420	53	11	124	177
	424	46	18	48	94
	422	13	19	84	97
	421	98	22	95	193

The following is a brief description of status of the Granite timber sale units as of July, 1991:

- Unit 3: Yarding was completed in 1983. Regeneration is now at least 5 feet high and the unit is adequately stocked.
- Unit 5: Yarding was completed in 1983. Unit is adequately stocked and the regeneration is at least 5 feet high.
- Unit 11: Yarding was completed in 1986. Regeneration is 1-3 feet tall and unit is adequately stocked.
- Unit 18: Yarding was completed in 1986. Regeneration is 3 1/2 to 4 1/2 feet tall and adequately stocked.
- Unit 22: Yarding was completed in 1986. Regeneration is 2 feet tall and unit is well stocked.
- Unit 23: Yarding was completed in 1986. Regeneration is less than 2 feet tall and appears to be well stocked.
- Unit 19: This unit is uncut at this time (July 1991). At this time it is possible that this unit will not be harvested under the Granite contract. The combined unit size will be less than 100 acres.

Identification of the Forest Service Preferred Alternative

The Etoilin IDT met with the Forest Supervisor and staff officers to select the alternative preferred by the Forest Service.

After reviewing all resource impacts, consequences, and opportunities, **Alternative 4** was identified as the preferred alternative.

Mitigation

The following steps are required as part of the timber sale implementation to mitigate consequences:

- (a) The decision has been made not to use the Olive Cove LTF. The Granite Timber Sale is currently scheduled to use the Starfish Cove LTF. This means that to limit conflicts to only two timber sale operators, the entire volume cleared in this EIS would likely be offered as one large timber sale.
- (b) Minimum 330-foot buffers would be maintained around eagle nest trees.
- (c) The high value wildlife areas (combined HSI greater than or equal to .7) would be deferred from timber harvesting for all alternatives this planning period.
- (d) All known or discovered cultural sites would be protected. If additional sites are discovered once the sale is in operation, protective measures will be taken under the timber sale contract provisions.
- (e) Pursuant to the Tongass Timber Reform Act, commercial timber harvesting within a buffer zone no less than one hundred feet in width on each side of all Class I streams and those Class II streams which flow directly into a Class I stream would be prohibited. In addition, stream protection would include provision of buffer areas and other protective actions consistent with best management practices and aquatic habitat management unit (AHMU) guidelines pertaining to (1) unstable banks, (2) temperature sensitivity, and (3) sedimentation, and (4) large, woody debris for rearing habitat, nutrient retention, and streambed stabilization.
- (f) Where deemed necessary, non-buffered channels would receive protection, such as removal of all introduced slash to prevent debris loading and subsequent washout (see Unit Descriptions, Appendix B).
- (g) Full bench construction and end hauling of excess excavated material would be required on designated areas for soil stability (see Road Descriptions, Appendix C).
- (h) The visual resource would be protected to the extent required to meet the visual quality objectives for the Starfish analysis area. Boundaries on units have been adjusted to reduce the impact on the view from Anita Bay and Mosman and Burnett Inlet. Landscape design principles would be used in the location and design of rock pits.
- (i) Internal exclusions were left in some units to help maintain wildlife habitat, structural diversity, visual quality and water quality.
- (j) Percent of watershed harvested was limited to threshold levels in order to maintain water quality and channel stability.

Mitigation (cont.)

- (k) The sale area improvement plan should consider the following specific projects in addition to the generally required projects:
1. Management for canopy gaps in regrowth within some units and within those identified older immature stands at the head of Mosman and Burnett Inlets
 2. Coho rearing enhancement in Pump Creek drainage.
 3. Willow and Cottonwood planting along roadsides.
 4. Rock pit and roadside rehabilitation would be applied as needed, and may include the planting of tree seedlings and spraying of rock weathering agents to allow a better blending with the natural surroundings.
 5. Stream stabilization.
 6. Virginia Peak recreation trail.
 7. Rehabilitation of lower Detailer Creek.

Monitoring

Monitoring is done to determine if the resource management objectives of the Starfish timber sale have been met. The results will be used to verify implementation and effectiveness of selected mitigation and protection measures in a timely manner. The following three types of monitoring were recognized in the development of the monitoring plan:

Implementation Monitoring

Implementation monitoring assesses whether the project was implemented as designed and whether or not it complies with the Tongass Land Management Plan. Planning for implementation monitoring began with the design of this timber sale. Specialists used on-the-ground inventories, computer inventories, and aerial photographs to prepare documents called unit cards for each harvest unit in the timber sale. Cards were also prepared for each segment of road. Resource specialists wrote their concerns on the cards and then described how the concerns could be addressed in the design of each unit and road segment. These documents will be the basis for determining whether recommendations were implemented for various aspects of this timber sale.

Best Management Practices

Implementation monitoring of soil and water resources will largely consist of monitoring best management practices, also known as BMP's (refer to Forest Service Handbook 2509.22). BMP's are designed to directly or indirectly protect water quality, and mitigate any adverse impacts on water quality which are associated with a land disturbing activity, such as timber harvesting, road building, and mining. For this project, monitoring will focus on timber and transportation-related activities. BMP implementation monitoring forms have been developed and are designed to be tailored to each site under consideration. Copies of these forms can be found in Appendix G. BMP's to be monitored at a specific site are determined through a review of unit/road cards, fish habitat reports and other appropriate documentation.

Site selection for timber units, and road segments will be on a random basis to eliminate bias in selecting sites. However, if a unit or road has special resource concerns, it may be monitored in addition to the randomly selected sites. It has not yet been determined what percentage of road segments will be monitored. The draft of the Tongass Land Management Plan currently proposes that 20% of the units harvested each year will be subject to implementation monitoring. Data collected through implementation monitoring will be entered into a BMP-monitoring database.

Pre-harvest issues of concern include land disturbing activities on high hazard soils (BMP's 13.2, 13.5, 13.16), road and landing location (BMP's 13.10, 14.3, 14.6 through 14.10, and others), and channel stability and streamside management, including stream temperature sensitivity (BMP's 12.6, 12.7, 13.9, 13.16). BMP's are prescribed for most all units or road segments. Review the unit and road cards for the preferred alternative (found in Appendix B) to see how BMP's are prescribed.

Effectiveness Monitoring

Effectiveness monitoring measures the effectiveness of design features or mitigation measures. The following displays the effectiveness monitoring that will be performed following implementation of an action alternative:

Soil and Water Quality

Tongass National Forest watershed managers are currently developing an effectiveness monitoring program to provide a *forest-wide* approach to coordinated, consistent and compatible data collection. Effectiveness monitoring will examine the value of best management practices for achieving management objectives. At this point, it is premature to define a monitoring program specifically for the Starfish timber sale, since it may not adequately fit into the forthcoming Forest-wide plan, or may prove to be difficult to complete. However, if the Starfish timber sale becomes part of the overall plan the monitoring may be as follows:

Who: Hydrologist and soil scientist.

What: Monitoring buffers, buffer strip design, and buffer strip stability on AHMU Class I and II streams; sideslope disturbance and how it varies on Class III V-notches with management prescriptions, and stream temperature sensitivity to increased watershed harvest. Streams in the Starfish analysis area seem to have higher rates of bedload movement than those on nearby islands. These streams may be monitored for changes in sedimentation rates and processes caused by roads or timber harvest.

Where: Randomly selected unit and road segments, with special attention focused on sites with potential or known concerns.

When: During and/or after completion of a land-disturbing activity. For example, during pioneer road construction, and after the completion of a road.

How: Approaches include monitoring above and below the project site, before and after the project occurs. Monitoring may be conducted on both test and control watersheds and streams. Specialists will use current guidelines in selecting parameters, sample locations, and sampling frequency. See also the draft outline in Appendix G.

Use: Data will be used to answer questions and address concerns raised by the Forest-wide effectiveness monitoring program.

More detailed information about soil and water quality monitoring can be found in the Starfish timber sale planning record.

Visual Quality

Who: District Landscape Architect

What: The effectiveness of topographic screening, within-stand leave trees, and unit boundary shaping in achieving inventory visual quality objectives.

Where: All management activities (roads, rock pits, harvest units, etc.) seen from sensitive travel routes discussed in Chapter 3, using viewpoints established by the landscape architect during project analysis.

When: As activities are completed, or within one year of project completion, then every five years afterward until units are no longer evident. If KV projects are initiated, a separate schedule will be developed to monitor their effectiveness.

How: Document effects with photos and by written format, indicating the existing visual condition resulting from management activities, what worked, what didn't, what to do differently next time, etc.

Use: Route copies of final report to the Forest landscape architect and the other District landscape architect, the Supervisor's Office recreation staff officer, and place a copy in the planning file. Results of report may be used in triggering KV projects to further mitigate the impacts of project development if the resulting visual condition conflicts with VQO's.

Wildlife

Who: District Wildlife Biologist

What: The effectiveness of the group selection cuts at maintaining wildlife habitat.

Where: In all the group selection units.

When: As the units are laid out, logged and annually thereafter.

How: Document average size of gaps, species mix and size of trees to be cut as compared to the remaining uncut trees (to check for high grading and habitat shifts), use of openings by various wildlife species and windfirmness over time.

Use: To determine if group selection harvest is effective at maintaining wildlife habitat values while allowing some timber harvest to occur.

Validation Monitoring

Validation monitoring is conducted to check on assumptions made about resource effects. It is usually carried out at the regional level. Although no validation monitoring is planned at this time for the Starfish timber sale, the Area wildlife biologists and ecologists may monitor and study the impacts of group selection helicopter yarding in achieving the designated management objectives. They may also analyze the results and evaluate effective patch size maintained for interior forest species.

Chapter 3

Affected Environment

Chapter 3

Affected Environment

Introduction

This chapter describes the environment of the Starfish Implementation Analysis Area that would affect, or be affected by, any of the proposed alternatives. The information has been taken from more detailed reports that are available for public review in the planning record, located at the Stikine Area Forest Supervisor's Office, Petersburg, Alaska.

The affected environment includes three value comparison units (VCU's) on the northern portion of Etolin Island, VCU's 464, 467, and 468. The south half of Etolin is managed for wilderness in accordance with the Tongass Timber Reform Act.

TLMP Direction

The current Tongass Land Management Plan (TLMP) defines land use opportunities and provides land management direction for the Tongass National Forest.

The Starfish analysis area is within management area S23. TLMP allocated value comparison units (VCU's) 467 and 468 to a land use designation (LUD) III (to be managed for a variety of uses and activities in a compatible and complementary manner to provide the greatest combination of benefits). VCU 464 was allocated to LUD IV (to be managed to provide opportunities for intensive development of resources). Emphasis here is primarily on commodity resources while providing for amenity values.

The plan's specific management direction and emphasis in the analysis area is to develop an interconnected road system for timber management and other resource uses if economically and environmentally feasible. Separate systems may be developed depending on geography. New facilities may be required as development begins in isolated areas.

Existing recreation opportunities and future options will be protected in Steamer Bay, 3-Way Passage, Rocky Bay, Mosman Inlet, and Burnett Inlet.

National Forest management will be compatible to the degree practicable with the State selection land and the private non-profit hatchery in Burnett Inlet.

Wildlife habitat improvement would be developed along with timber sale activities wherever needed.

Major visual quality objectives (VQO's) will range from "partial retention" to "maximum modification" with the higher quality objectives in the areas seen from the major water transportation routes. "Retention" VQO will normally apply to the immediate vicinity of specific recreation features.

For a more detailed description of the current TLMP and its management direction, see the 1979 Tongass Land Management Plan and Tongass Land Management Plan Amendment, dated winter 1986-87.

Forest Plan Revision

The current Tongass National Forest Land Management Plan is being revised. As part of the revision process, changes in management direction for the Starfish analysis area will be considered. Even so, management activities will continue under the direction of the current plan until the revision process is completed. The proposed timber sale is consistent with the current plan direction and is anticipated to be offered for sale prior to the completion of the revised plan.

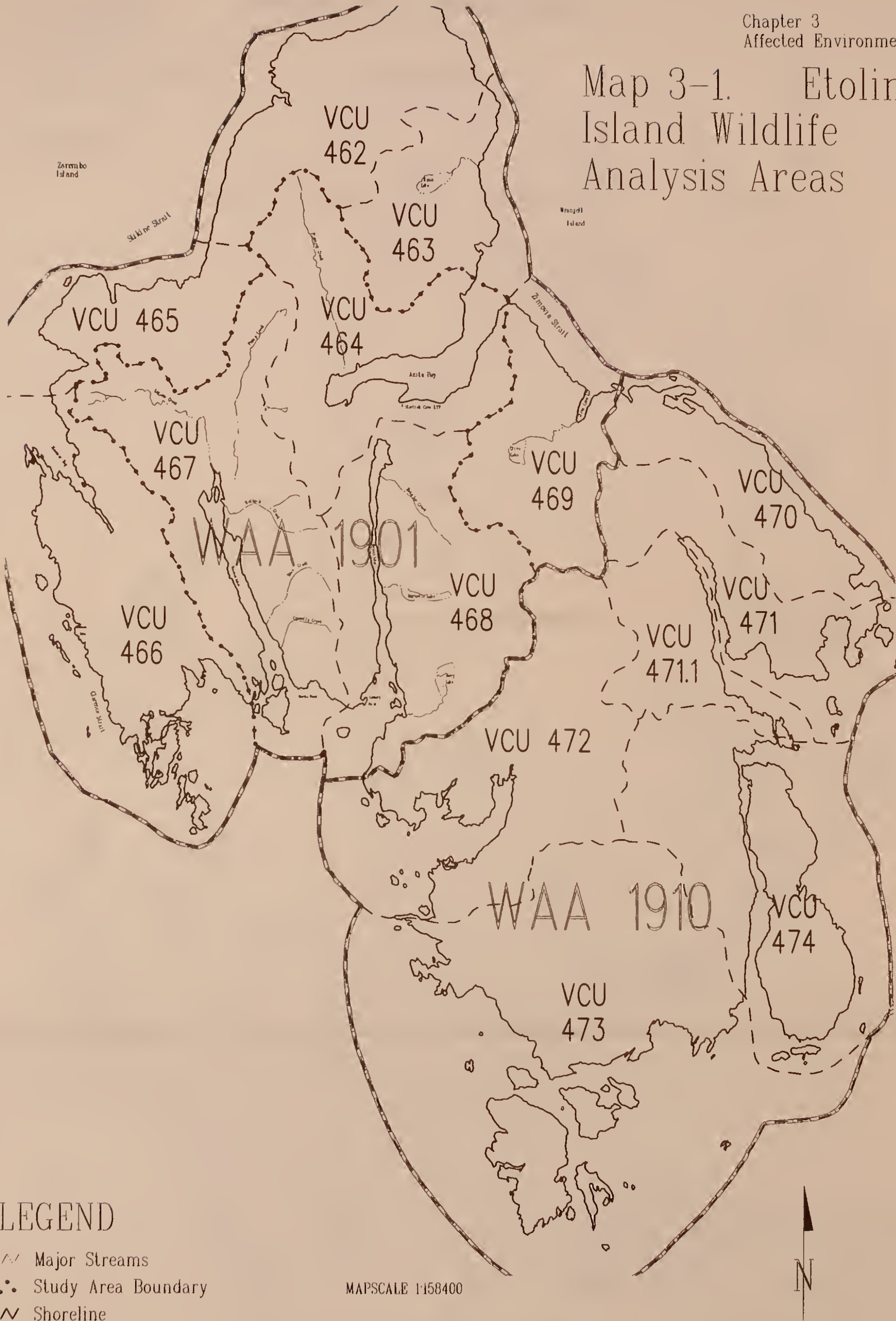
Wildlife

The north half of Etolin is divided into value comparison units (VCU's) 462 through 471, and is managed by Management Direction S23 for road construction and timber harvest. This portion of the island, excluding VCU's 470 and 471, corresponds to Alaska Department of Fish and Game's wildlife analysis area (WAA) 1901. VCU's 471.1 through 474 comprise the South Etolin Wilderness Area. It was assumed that wildlife habitat on south Etolin will not change because of forest management activities in the foreseeable future. The location of the proposed timber sale will be within VCU's 464, 467, and 468, hereafter referred to as the study area. Refer to Map 3-1 and 3-2.

The study area supports a variety of wildlife common to southeast Alaska. Forest Service personnel recorded the following species on North Etolin Island between 1987 and 1990:

Bald Eagle	Pine Siskin
Barrow's Goldeneye	Kingfisher (Belted)
Beaver	Marbled Murrelet
Belted Kingfisher	
Black Bear	Mallard Duck
Brown Bear	Merganser (Common)
Blue Grouse	Mink
Brown Creeper	Moose
Chestnut-backed Chickadee	Porcupine
Dark-eyed Junco	Raven
Elk	Red Squirrel
Gray Wolf	Red-tailed Hawk
Harlequin Duck	River Otter
Hermit Thrush	Sitka Black-tailed Deer
Great Blue Heron	Steller's Jay
Golden-crowned Kinglet	Toad (<i>Bufo boreas</i>)
Harbor Seal	Vancouver Canada Goose
Humpback Whale	Varied Thrush
Pine Marten	Winter Wren

Map 3-1. Etolin
Island Wildlife
Analysis Areas





Threatened, Endangered, or Sensitive Species

The humpback whale, American peregrine falcon and Steller sea lion were evaluated to determine their presence and habitat requirements within the study area. None of these federally listed threatened, endangered, or sensitive species occur regularly within the study area. There is neither designated critical habitat nor any site considered for designated critical habitat for the humpback whale or peregrine falcon on or near Etolin Island. Preliminary consultation with the National Marine Fisheries Service indicates that there are no defined haulout areas for Steller sea lion near the study area. There are no federally listed plant species in southeast Alaska. None of the candidate plant species occur near the study area (US Fish and Wildlife Service, 1989; National Marine Fisheries Service, 1987 and 1991).

Wildlife species were selected for analysis based on public concerns expressed during the public comment period, and by various agency biologists concerned with monitoring indicator species that would represent habitat requirements for an assortment of other wildlife species (USDA Forest Service Tech. Pub. R10-TP-2, 1986). The management indicator species (MIS) selected for analysis are Sitka black-tailed deer, bald eagle, black bear, pine marten, and river otter.

Subsistence

The historical use of wildlife resources on Etolin Island is not well documented. A community of approximately 400 individuals was established at Cannery Point in Burnett Inlet during World War II. The community was sustained for approximately five years and then abandoned. Subsistence use of fish and wildlife resources is assumed to have been high during this period. The communities of Wrangell, Petersburg, Meyers Chuck, Point Baker, Port Protection, Edna Bay, Hydaburg, and Coffman Cove are documented subsistence resource users of the study area. Preliminary information available from the Tongass Resource Use Cooperative Study (TRUCS) indicates that the communities of Wrangell, Petersburg and Point Baker are active subsistence resource users of deer, marine mammals, salmon, marine invertebrates, and finfish within the study area (TRUCS 1988-1989).

Harvest Records

North Etolin used to be one of several "preferred hunting areas" for Wrangell deer hunters. The hard winters of 1963 through 1973 caused a severe decline in deer numbers throughout southeast Alaska. The deer population has recovered in some areas, but not in others. The deer population has not recovered to the pre-1969 population levels on North Etolin Island and hunter use is currently light. Alaska Department of Fish and Game's 1989 Harvest Records indicate that 30 deer were taken from the entire island (WAA 1901 & 1910) with an average harvest of 25 deer over the past three years. Average annual harvest from 1960 through 1968 (prior to the severe winters) has been estimated to be 190 deer from all Etolin Island (Doerr and Sigman, 1986). Harvest records (1989) compiled for north Etolin (WAA 1901) indicate that 28 marten, 5 otter, 5 black bear, 2 beaver, 3 wolves, and 2 wolverines were reported harvested. The average harvest of these species from 1985 through 1989 was 11 marten, 3 otter, 2 black bear, 2 beaver, 2 wolves, and 0.4 wolverines. Bald eagles, which once brought a two dollar bounty, are now protected and the population appears to be stable (Land, 1990 ADF&G).

Analysis Method

Habitat capability computer models were developed for each of the MIS by a team of biologists representing the U.S. Fish and Wildlife Service, Alaska Department of Fish and Game and the U.S. Forest Service. The models provide an objective method to evaluate habitat and determine the effects of implementing timber harvest alternatives. The assumptions used to create the models are based on the compilation of available scientific research. The models, created for each of the MIS, are available for review from the USDA Forest Service and will not be covered in depth in this document (DRAFT Habitat Capability Models, USDA Forest Service, 1988-1990). The potential value of each stand is determined based on various characteristics such as volume class, elevation, aspect, and relative position in relation to streams or salt water. The quality of habitat for each species is indicated by the habitat suitability index (HSI) value. The highest HSI value that an area can have is 1.0. A rating of 1.0 means that a stand has *potentially* the best suitable habitat for maintaining a species. Stands receiving a HSI value of 0.0 or 0.01 would have no or very little value to that species. An HSI value of 0.25 indicates a stand with the capability to support 25 percent of the numbers of individuals that the very best habitat could support. The HSI value and carrying capacity is determined for each distinctive stand for each species. Then the total carrying capacity and average HSI values are determined for the entire study area.

Field inventories were conducted by Forest Service wildlife biologists during the summers of 1987, 1988 and 1990 to inventory habitat. Information collected was used to validate the model outputs and identify high use wildlife habitat areas. These high use areas are shown on Map 3-6. Not every stand was visited, so there may be other high use areas. Field investigations were concentrated in those stands which were proposed for harvest in the various alternatives.

The models were used to predict the amount of suitable habitat (by MIS) within the study area as compared with the total suitable habitat on Etolin Island. Figure 3-1 shows the relative value of the 3 VCU's in the study area as compared to the rest of Etolin Island. This graph is useful in displaying the importance of 'the big picture' to many wildlife species. Some species have very specific habitat requirements and these habitats may be relatively rare, such as the riparian zones along fish streams used by otter or the cliffs used by mountain goats. Other species such as deer and bear use a wide range of habitats. Some of these habitats are definitely more valuable than others, but the carrying capacity of an area is determined by the cumulative value of all the stands. For example, in VCU 464 the 12 acres of highest value deer winter range are capable of supporting 1.5 deer, while the 1,040 acres of moderate value can support 92 deer. Some of the VCU's on Etolin Island are very large with many acres of mid-value habitat capable of supporting more wildlife than small VCU's with more acres of high-value habitat. The graph displays the percent of carrying capacity by VCU on Etolin Island. The highest carrying capacity for all of the MIS is in VCU 473. The second highest carrying capacity for black bear and marten is within the study area (VCU 467). The study area supports the third highest carrying capacity for otter and Sitka black-tailed deer (VCU 467) and black bear (VCU 468). The study area supports the fourth highest carrying capacity for Bald Eagle (VCU 467).

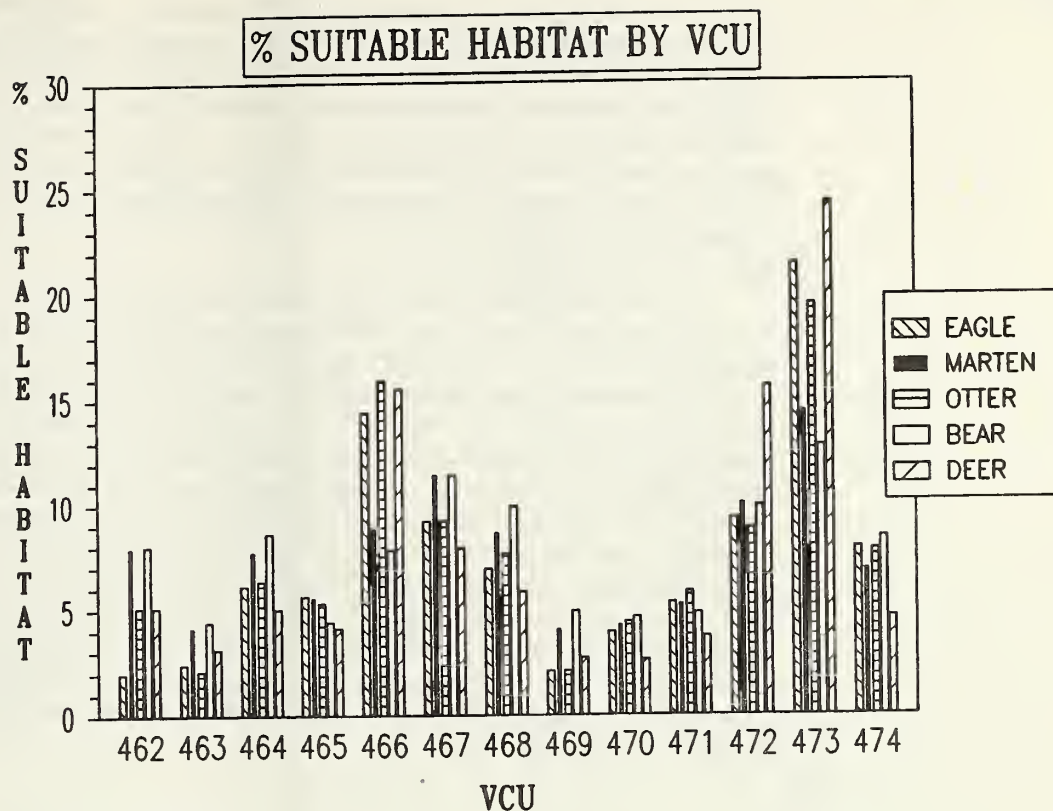


Figure 3-1.

There has been some timber harvest in the study area in the past. This has caused a slight decline in the carrying capacity for all 5 MIS. The original and current carrying capacity for each MIS are shown by VCU in Table 3-1 for each of the 3 VCU's in the study area. Deer winter range and marten habitat values are shown on Maps 3-3 and 3-4 respectively. Documented eagle nest trees are shown on Map 3-5.

Table 3-1. Original (Orig) and current (1990) carrying capacity, in numbers of animals, by VCU for deer, black bear, marten, otter and bald eagle.

VCU	Deer		Bear		Marten		Otter		Eagle	
	Orig	1990	Orig	1990	Orig	1990	Orig	1990	Orig	1990
464	392	345	33	32	44	42	18	17	28	24
467	582	568	46	45	69	64	27	25	40	36
468	393	382	38	37	50	49	26	24	33	29
Total	1,334	1,295	117	114	163	155	71	66	101	89

There is considerable overlap in suitable habitat for the 5 MIS used in this analysis. Overlap was highest in areas with large, old trees, growing at low elevations in close proximity to water. An average HSI value of greater than or equal to .7 ($\geq .7$) was selected to represent a conglomeration of suitable habitat for the MIS. The habitat types identified with an average HSI of $\geq .7$ were primarily estuary, beach, and riparian.

3 Affected Environment

The Tongass Land Management Plan specifies a percentage of operable commercial forest land (CFL) by VCU to be retained as wildlife habitat, that is, no timber harvest through the rotation. There are several retention categories, each with its own retention percentage which varies by land use designation. The various retention categories, the percent and number of acres to be retained for each VCU and the acres remaining by alternative are presented in Table 4-7 in Chapter 4. Retention only applies to **operable** CFL--those forested stands that can actually be logged. All of the **Inoperable** CFL will still be in its original old-growth condition at the end of the rotation.

In the development of the alternatives, stands having an average HSI value ≥ 7 were avoided. An additional 2,600 acres were identified during field investigations as having high use by deer and nesting and moulting Vancouver Canada geese. As much as possible, these areas were also avoided during alternative development. There are approximately 1,000 acres in the mandated 100-foot buffers around anadromous fish streams and some of their tributaries. These areas would fulfill part of the need for maintenance of riparian areas for some of the retention categories. Another 5,000 acres of retention, primarily in upland areas, still needs to be designated to meet current Forest Plan Direction. No other exceptional high value or high use areas have been identified at this time. There are numerous old-growth areas where these 5,000 remaining acres could be located. Since the forest plan is currently being revised and it is expected that the direction for old-growth management may change, we do not want to designate specific stands for retention at this time. The high value and high use areas that have been identified and are recommended for retention are shown on Map 3-6.



Stream at head of Mosman Inlet

Map 3-3. Existing Deer Winter Range Values



LEGEND

- Major Streams
- Study Area Boundary
- Shoreline
- High Value Deer Winter Range
- Moderate Value Deer Winter Range
- Low Value Deer Winter Range

MAPSCALE 1:100000



SCALE is 1 INCH = 1.58 MILES



Map 3-4. Existing Marten Habitat Values



LEGEND

- Major Streams
- Study Area Boundary
- Shoreline
- High Value Marten Habitat
- Moderate Value Marten Habitat
- Low Value Marten Habitat



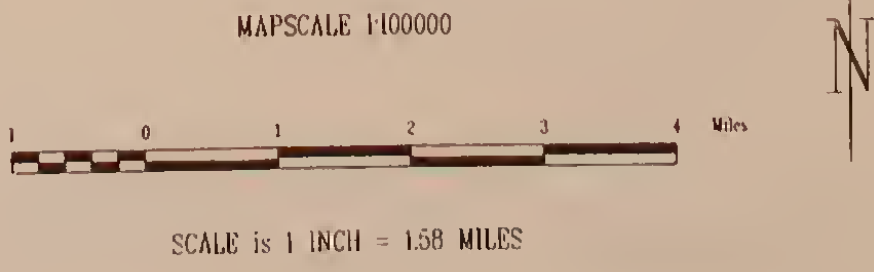
SCALE is 1 INCH = 1.58 MILES

Map 3-5. Documented Eagle Nest Trees.

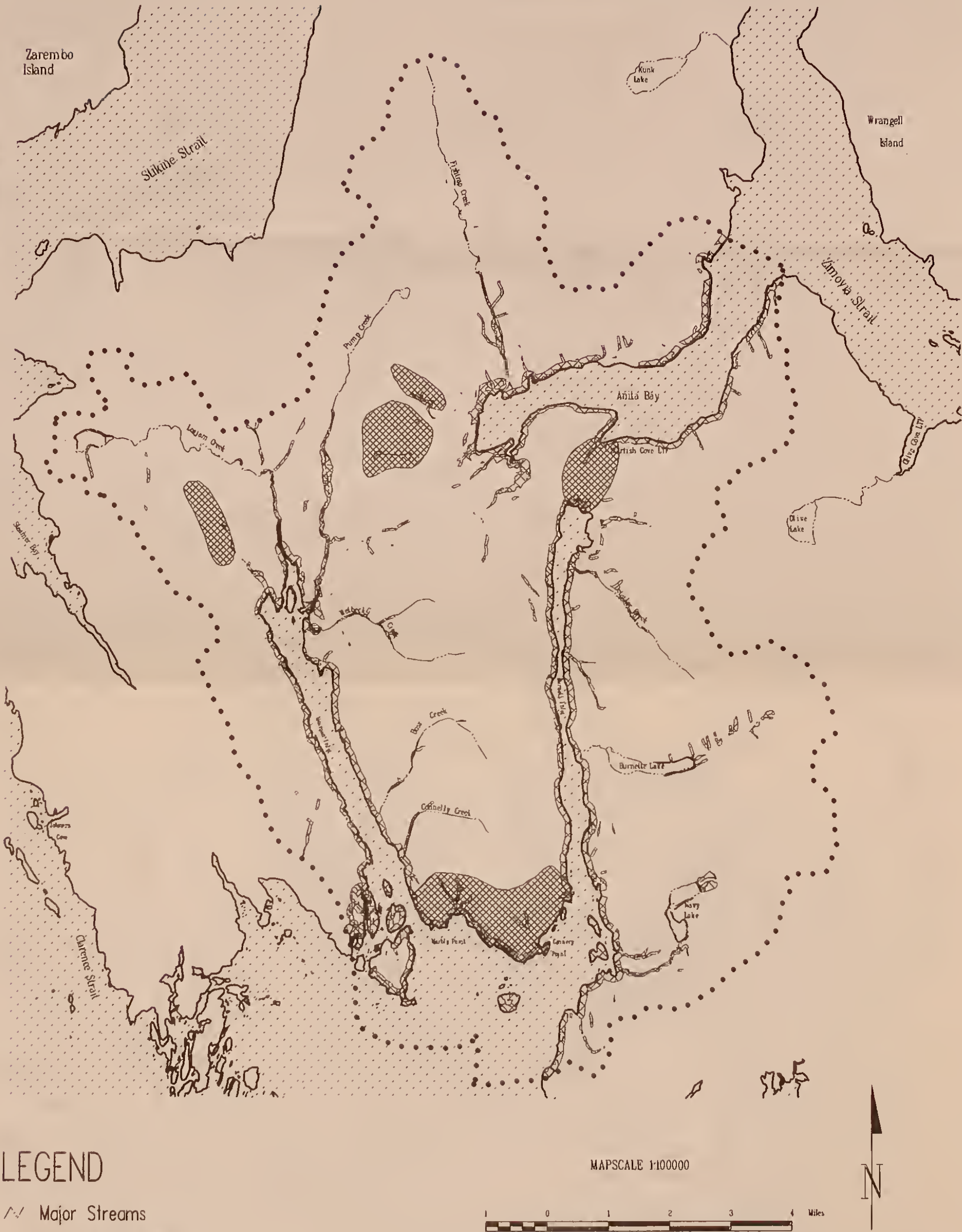


LEGEND

- Major Streams
- Study Area Boundary
- Shoreline
- Documented Eagle Nest Trees



Map 3-6. High Value Wildlife Habitat

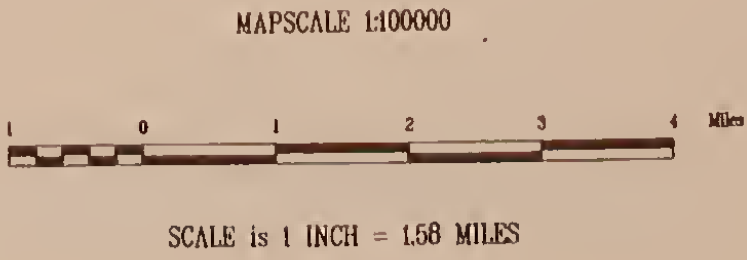


Map 3-7. Fish Streams



LEGEND

- | | |
|------------------------|----------------------|
| •• Study Area Boundary | ▨ Lakes |
| ~ Shoreline | ■ Existing Clearcuts |
| ~ AHMU Class I | |
| ~ AHMU Class II | |
| ~ Existing Roads | |



Fisheries

As depicted in Map 3-7 and Table 3-2, the analysis area contains 19 ADF&G-numbered anadromous salmon streams: six in VCU 464/Anita Bay, eight in VCU 467/Mosman Inlet, and six in VCU 468/Burnett Inlet. Level 3 stream survey data is available for all these streams except MI-4 (Boss Creek), located along the eastern shore of Mosman Inlet. The present level of information on this stream is based on aerial photo inventory of channel types. The listing of ADFG-numbered anadromous fish streams provides a reference of known value to date. Cataloging of streams is a continual process, with inventories conducted by ADFG and USDA-Forest Service, resulting in catalog updates annually. The analysis includes field inventory to determine presence/absence and upper limit of fish species in streams of the study area.

The salmon, trout, and char species inhabiting the analysis area are pink (*Oncorhynchus gorbuscha*), chum (*O. keta*), coho (*O. kisutch*), and sockeye (*O. nerka*) salmon, steelhead (*O. mykiss*) and cutthroat (*O. clarki*) trout, and Dolly Varden char (*Salvelinus malma*).

Commercial Fisheries

Anita Bay and Mosman and Burnett Inlets support a Dungeness crab fishery. Anita Bay has supported a herring fishery in the past, but not in recent years. Waters adjacent to the analysis area also support shrimp and halibut. Streams of the analysis area contribute significantly to the salmon fishery.

A private, non-profit salmon hatchery, operated by Alaska Aquaculture Foundation, Inc. also contributes to the salmon fishery. Pink and chum salmon have been the managed species in the past, but chinook are being added to the expanding facility located at the mouth of Burnett Lake Creek in Burnett Inlet.

Sport Fishery

None of the lakes or streams in the analysis area were listed as "High Quality Sport Fishing Systems" by ADF&G-Sport Fish Division in 1977 for use in developing the Forest Plan.

The larger streams, including Fishtrap and Duckbill Creeks in VCU 464/Anita Bay; Gorbusha, Logjam, and Pump Creeks in VCU 467/Mosman Inlet; and Navy Creek in VCU 468/Burnett Inlet, have a high potential for some good to excellent sport fishing. Access to those streams draining into Mosman and Burnett Inlets is limited by distance and exposure to open water, which inhibits non-commercial use from reaching high levels. Short-term (5-10 years) intensive sport/subsistence use occurs when logging and other industrial/administrative camps are active on the island. The lack of a permanent boat mooring float as an interface to the road system probably limits the long-term pressure on fish populations by sport use.

Subsistence Fishery

A limited number of streams and bodies of saltwater in the analysis area have been the source of unregulated subsistence harvest. A limited number of subsistence harvest permits have been issued in the past for Mirkwood Creek in Mosman Inlet and Navy Creek in Burnett Inlet. Intensity of use, determined by numbers of participating households; level of harvest, shown by pounds of fish harvested; and contribution to total household harvest are unknown. (TRUCS 1988-1989)

Salmon Harvest. The waters of Anita Bay and the mouths of Burnett and Mosman Inlets in addition to Goose Lakes Creek/107-30-10780 have been reported as non-commercial salmon harvest areas.

Non-Salmon Finfish Harvest. Included in this category are halibut, rockfish, herring, cod, sole/flounder, trout, and others. The waters of Anita Bay, Burnett Inlet, and the mouth of Mosman Inlet in addition to Fishtrap/107-30-10810, Goose Lakes/107-30-10780, Duckbill/107-30-10760, and Burnett Lake Creeks have been reported as non-commercial non-salmon finfish harvest areas.

Table 3-2. ADF&G Numbered Stream Data

VCU Name	Local Name	ADF&G No	Major Species	Habitat Quality	Mean Escapement Peak Escapement		Years of Data		Other Species	Special Considerations
					Pink	Chum	Pink	Chum		
1. Anita	Duckbill	107-30-10760	Pink	Fair spawning, Good rearing	<u>1,100</u> 1,800	<u>20</u> 30	5	2	SS,CT	Temperature, 5700 ft to barrier
2. Anita	Goose lakes	107-30-10780	Pink, chum	Good spawning, Excellent rearing	200 900	<u>60</u> 350	4	2	SS,DV	Temperature; Lake
3. Anita		107-30-10800	Pink, coho							Short reach
4. Anita	Fishtrap/ Brad	107-30-10810	Pink, chum	Excellent spawning, Good rearing	<u>1,000</u> 3,000	<u>350</u> 6,000	24	15	SH,SS, DV,CT	Large substrate
5. Anita	AB-3/Falls Cr		Dolly Varden							Needs verification
6. Anita	AB-4	107-30-10840	Coho							Short reach
7. Anita	AB-2/Starfish		Cutthroat	Good rearing						Temp; 600 feet
8. Anita	AB-5		Cutthroat							430 feet to barrier
9. Anita		107-30-02001	Pink, chum							Short reach
10. Moaman	Mirkwood	106-22-10040	Pink, chum	Excellent spawning, Good rearing	<u>3,000</u> 7,100	<u>20</u> 100	18	9	SS,DV,SH	4,500 ft length
11. Moaman	Logjam	106-22-10060	Pink, chum	Excellent spawning, Good rearing	<u>16,200</u> 80,000	<u>240</u> 2,000	33	24	SS,CT, DV,RS,SH	5,850 ft ITZ, 5,040 ft to barrier
12. Moaman	Pump	106-22-10080	Pink, chum	Excellent spawning, Excellent rearing	<u>8,900</u> 84,000	<u>600</u> 10,000	38	36	SS,DV,RS	2,100 ft ITZ, 10,500 ft length Temperature
13. Moaman	Wetbeck	106-22-10100	Pink, chum	Excellent spawning, Good rearing	<u>1,700</u> 7,800	<u>200</u> 920	19	17	SS	250 ft ITZ, 1,290 ft to barrier
14. Moaman	MI-1	106-22-10118	Coho	Good spawning, Good rearing					DV	Temperature, 1,500 ft length
15. Moaman	MI-2	106-22-10114	Coho	Poor spawning, Poor rearing					DV	1,200 ft length

Table 3-2. ADF&G Numbered Stream Data (continued)

VCU Name	Local Name	ADF&G No	Major Species	Habitat Quality	Mean Escapement ¹ Peak Escapement		Years of Data		Other Species	Special Considerations
					Pink	Chum	Pink	Chum		
16. Mosman	MI-3/Connelly	106-22-10112	Coho	Poor spawning, Poor rearing					DV	1000 ft to barrier
17. Mosman	MI-4/Boss ¹	106-22-10110	Coho	Poor rearing						Survey needed
18. Mosman	MI-6		Dolly Varden	Poor spawning, Poor rearing						1,700 ft length, Narrow
19. Mosman	MI-7		Dolly Varden	Poor rearing						Very short reach
20. Burnett		106-22-10130	Pink	Fair spawning, Good rearing	$\frac{300}{800}$		6		SS,DV	Temperature; acid, 300 ft length
21. Burnett	BI-1	106-22-10140	Pink	Fair spawning, Excellent rearing	$\frac{700}{3,000}$		SS,CH $\frac{12}{20}$			1,500 ft to barrier temperature
22. Burnett	BI-2	106-22-10144	Pink, chum	Poor rearing	$\frac{1,500}{2,000}$	$\frac{60}{1,000}$	11	6		Short reach
23. Burnett	Navy Creek	106-22-10160	Pink, chum	Excellent spawning Good rearing	$\frac{10,300^2}{15,700^3}$ 49,000	$\frac{70^2}{180^3}$ 300	20 ² 13 ³	7 ² 9 ³	SS,SH,DV, CT,RS	Temperature; Lake 2400 ft to barrier
24. Burnett	BI-11/Detailer	106-22-10148	Pink, chum		$\frac{700}{4,700}$	$\frac{20}{250}$	8	4		1900 ft to barrier Short reach
25. Burnett	BI-4		Dolly Varden							Short reach
26. Burnett	BI-5									Short reach
27. Burnett	BI-9		Dolly Varden	Good rearing						Large substrate
28. Burnett	BI-12		Dolly Varden	Poor spawning, Fair rearing						High gradient
29. Burnett	BI-13/Burnett Lake		Dolly Varden						CT	Hatchery water source
30. Burnett	BI-14		Pink	Poor spawning						Fine substrate

¹ Data Incomplete—Survey needed at low water² Pre-enhancement³ Post-enhancementSS = coho SH = steelhead DV = Dolly Varden
CH = chum CT = cutthroat RS = Sockeye

3 Affected Environment

Marine Invertebrate Harvest. Included in this category are clams, crab, shrimp, octopus, sea cucumbers, herring eggs, and others. The waters of Anita Bay and the mouth of Burnett Inlet have been reported as non-commercial invertebrate harvest areas.

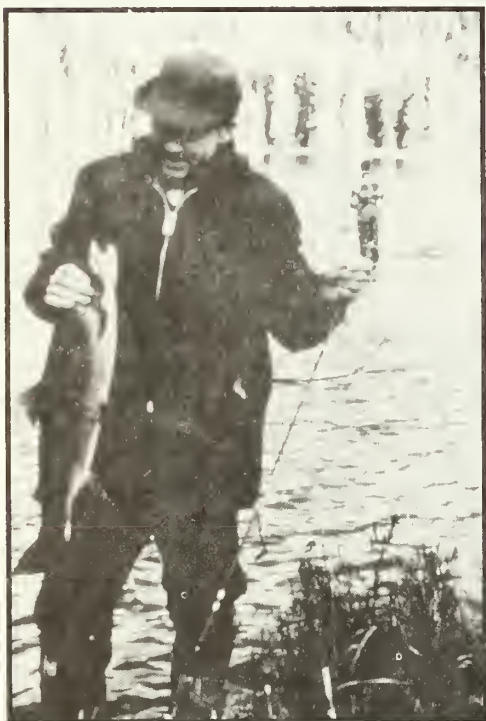
Enhancements

ADF&G and Forest Service jointly installed a Denil steepness pass in the lower reach of Navy Creek in 1975. Alaska Aquaculture Foundation, Inc. operates a private, non-profit hatchery constructed in 1978 at the mouth of Burnett Lake Creek on the eastern shore of Burnett Inlet.

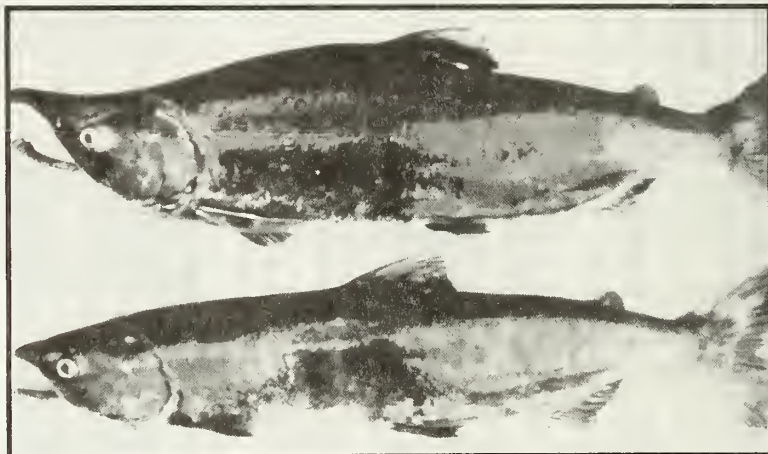
Productivity/ Escapement

Table 3-2 (preceding pages) summarizes spawning escapement as an indicator of relative productivity of the streams in the analysis area. Logjam, Navy, and Pump Creeks are far and away the most important producers of pink salmon in the analysis area, with mean escapements of 16,200, 15,700, and 8,900 respectively, and peak escapements of 80,000, 49,000, 84,000 respectively. Pump, Fishtrap, Logjam, Wetbeck, and Navy Creeks are important chum producers with mean escapements of 600, 350, 240, 200, and 180 respectively, and peak escapements of 10,000, 6,000, 2,000, 920, and 300, respectively. Coho are also an important subsistence, commercial, and sport fish species produced by these streams. Comparable escapement data are unavailable for coho. Due to dark water and overstory canopy, making aerial survey difficult. Fishtrap, Mirkwood, and Navy Creeks are known to produce steelhead, a highly valued sportfish species.

Chum Salmon



Steelhead Fishing



Cutthroat Trout

Temperature Sensitivity

Elevated stream temperatures not only reduce the oxygen-carrying capacity of the water, but affect the metabolism of aquatic animals, including the demand for oxygen. A number of factors, usually occurring in various combinations, can contribute to the development of an elevated water temperature/low oxygen stream condition. Such factors include low stream gradient, east-west orientation, bedrock substrates, low turbulence, low canopy coverage (shade)-to-water surface area ratio, drainage of lakes or extensive muskeg areas, extensive intertidal zones, lack of tidal flushing, and high spawning escapements. Not all fish kills occur in the intertidal zone, but in upstream sections as well.

Harvest of the streamside canopy has the potential not only to intensify fish mortality during drought years, but also to increase temperature sensitivity in any given year. Depending upon channel type and solar orientation (aspect), this can apply to Class III and Class II streams as well as the Class I streams in which oxygen-related mortality is usually observed.

Nine of the twenty streams listed in Table 3-2 are known to be temperature-sensitive. As summarized in Table 3-4, oxygen-related fish kills were documented in 1977, prior to initial road-based entry into the analysis area in 1983. Navy Creek had another fish kill in 1979. Goose Lakes Creek was observed to have suffered low-water die-off in 1981, and Mirkwood Creek again in 1986. Following initial entry into the Pump Creek drainage in 1986, Pump Creek experienced oxygen-related mortality in 1987 when escapement was estimated to be 50% of average.

In 1980, the environmental assessment for the (still active) Granite timber sale required stream temperature monitoring of Gorbuscha Creek, a tributary of Logjam/Flat Creek, and buffer strips along temperature-sensitive streams adjacent 5 harvest units. Although recording thermographs were placed in Gorbuscha Creek prior to harvest, no post-harvest measurements were taken due to problems with instruments and lack of funding for such monitoring.

In 1988, Logjam/Flat Creek (106-22-10060) was one of five other streams on Etolin Island identified by ADFG as meeting criteria as drought study streams. Initial surveys were conducted by ADFG in 1988, a relatively cold, wet summer, with no drought-induced mortalities observed. No measurements have been taken in succeeding years, nor have any fish kills been observed.

Fisheries Goals and Objectives

The Forest Service's goal is to "protect and/or enhance fish resources and their habitat" (*Area Guide*, p.79). Put in slightly different terms, the goal is "to preserve the biological productivity of every fish stream on the Tongass". Protection to reduce risk to water quality and fish habitat can range from precluding roading and timber harvest to the use of management prescriptions that control development activities, monitor effects, and provide for rehabilitation of unforeseen man-caused or natural habitat damage (TLMP, p. 92).

Standards and Guidelines

Results of research published since TLMP (1979) have led to the development of the state-of-the-art guidance published in the *Region 10 Aquatic Habitat Management Handbook* (FSH 2609.24), which guides development of prescriptions to address limiting factors, and the *Soil and Water Conservation Handbook* (FSH 2509.22), which contains best management practices (BMP's) for meeting the water quality goals of the Clean Water Act. The aquatic habitat management guidance, which is based on stream channel types and the stream classification system, has yet to be revised subsequent to the recent Tongass Timber Reform Act which limited managers' discretion in formulating and applying prescriptions to anadromous streams. Until regulations are promulgated from the Tongass Timber Reform Act, commercial timber harvesting within a minimum one hundred foot buffer strip on each side of Class I streams and Class II streams tributary to Class I streams is prohibited.

3 Affected Environment

Stream Classification

Stream classification is a value determination that is related to the beneficial uses of water. It is one of a series of descriptive layers that lead to management prescriptions: 1) **channel type** is a *physical* descriptor; 2) **stream class** is a *value* descriptor; and 3) **Aquatic Management Habitat Unit (AHMU)** prescription is a *management* descriptor.

Table 3-3. Summary Comparison of Stream Class Lengths by Stream

VCU Name	Local Name	ADF&G No	Stream Length (feet)		
			Class I	Class II	Class III
Anita	Duckbill	107-30-10760	24,000	8,500	22,700
Anita	Goose Lakes	107-30-10780	16,400	2,600	18,800
Anita		107-30-10800	2,600		
Anita	Fishtrap/Brad	107-30-10810	15,900	11,500	53,700
Anita	AB-Falls Cr			6,300	17,400
Anita		107-30-10840	1,300		4,900
Anita		107-30-02001	1,300		
Anita	AB-2/Starfish		2,300		
Anita	AB-5			400	6,100
Anita	(SUBTOTAL)		63,800	23,300	123,600
Mosman	Mirkwood	106-22-10040	3,600	3,900	23,600
Mosman	Logjam	106-22-10060	22,200	7,400	2,500
Mosman	Pump	106-22-10080	33,000	22,000	44,500
Mosman	Wetbeck	106-22-10100	2,700	5,400	39,500
Mosman	MI-1	106-22-10118	6,200		11,100
Mosman	MI-2	106-22-10114	1,700		
Mosman	MI-3/Connelly	106-22-10112	2,000	5,800	14,300
Mosman	MI-4*/Boss	106-22-10110	4,000	8,200	28,500
Mosman	MI-6			900	
Mosman	MI-7			1,700	
Mosman	(SUBTOTAL)		75,100	55,300	164,000
Burnett		106-22-10130	2,000		
Burnett	BI-1	106-22-10140	4,500		19,200
Burnett	BI-2	106-22-10144	1,900		
Burnett	BI-4			200	3,200
Burnett	BI-5			800	6,100
Burnett	BI-9			1,200	3,200
Burnett	Navy	106-22-10160	8,500	2,200	30,300
Burnett	BI-11/Detailer	106-22-10148	1,900	12,600	35,800
Burnett	BI-12			6,500	10,800
Burnett	BI-13/Burnett Lk			19,300	103,200
Burnett	BI-14		3,700		3,700
Burnett	(SUBTOTAL)		22,500	42,800	215,500
TOTAL			161,400	127,400	503,100

Class I - habitat or enhanceable habitat for anadromous or adfluvial fish; or high value recreational resident fishery

Class II - habitat for resident fish; or limited value recreational fishery

Class III - no fish populations, but exert direct influence on downstream Class I and II stream water quality

*Data incomplete--survey needed

A summary comparison of channel types comprising important fish streams of the analysis area is provided in the Watershed section, pages 3-38. A description of physical characteristics and management considerations is provided in "Channel Types Field Guide--Draft: A Guide to Stream Mapping Units on the Tongass National Forest Chatham/Stikine Area" (R10-MB-6). Map 3-7 displays the Class I and II streams in the analysis area. Table 3-7 summarizes the stream class lengths of the fish streams in the analysis area. The information summarized in the tables can be used, when integrated with other resource objectives, to develop AHMU prescriptions for streamside forest management.

Rehabilitation and Enhancement

A variety of treatments have proven effective in reducing or eliminating factors which limit fish production. Degree of success or appropriateness of each treatment depends upon fish species and life stage, the factor(s) limiting production, and stream channel type. Upstream access is usually the most obvious limiting factor and is treated by installation of fishways. Other in-stream treatments include the insertion of large woody debris (LWD), boulders, or gabions and the development of rearing ponds or side channels for spawning or rearing.

Rehabilitation Opportunities

The lower reaches of the creeks entering the heads of Mosman and Burnett Inlets were logged in the 1940's using methods deemed unacceptable by today's standards. The existing streambeds appear to have been used as skid roads in yarding the logs to saltwater, severely disturbing fish habitat. Large woody debris (LWD), critical for stabilizing spawning gravels and providing rearing habitat for some species, was displaced or totally removed. These stream sections have only begun to recover to pre-logging conditions due to the relatively short time elapsed, in terms of stand development and LWD recruitment, since harvest.

The lowermost 1,000 feet of Wetbeck (Mosman Inlet) and Detailer (Burnett Inlet) Creeks are channel types which have a moderate-to-high probability of responding to rehabilitation treatments such as alder canopy thinning and rearing habitat structure insertion. Knutsen-Vandenberg (KV) money collected from the Granite Timber Sale would likely be the best source of funding for rehabilitating Wetbeck Creek. Regular appropriations or KV collections from this proposed timber sale or future sales could be the source of funding for such work in Detailer Creek. Other nearby streams would not be treated due to channel types and/or fish species present.

Enhancement Opportunities

Logjam/106-22-10060, Wetbeck/106-22-10100, and Detailer/107-22-10140 Creeks have bedrock falls which are complete barriers to upstream migration. These barriers are significant in size and would not be cost-effective to ladder at this time.

Beaver ponds and other low velocity channel types with an abundance of pool area are the most productive for coho salmon smolts. These habitats provide critical overwintering habitat for a variety of species and life stages. The analysis area has some tributaries which have been occupied by beaver in the past, but are presently abandoned, apparently due to lack of food supply. These old beaver pond areas could be rejuvenated by creating artificial dams or by planting hardwood forage for beavers or both.

Existing Risk

Development of roads and--to a lesser degree--timber harvest present a currently unquantifiable risk to water quality and fish habitat. This relative risk is expressed in miles of road, number of stream crossings, miles of buffered/unbuffered stream, and percent watershed harvest. The application of best management practices in selecting how and where to build road and to harvest timber significantly reduces, but may not totally eliminate any risk. Portions of the analysis area have been previously developed; thus some risk to fisheries already exists. This is summarized in Table 3-5, Existing Relative Risk in Class I Stream Watersheds. This information provides a baseline from which to make comparisons of risk presented by the alternatives in Chapters 2 and 4.

Table 3-4. Temperature-related Fish Mortality

Stream Name	ADFG Number	Fish Kill Date	Estimated Mortality	Escapement
Goose Lakes Mirkwood Pump	107-30-10780	August 18, 1980	30	900
	106-22-10040	Sept. 17, 1986	600	2,000
	106-22-10080	August 24, 1977	1,500	37,500
BI-1 Navy	106-22-10140	August 24, 1987	200	4,700
		August 24, 1977	no estimate	3,000
	106-22-10160	August 17-24, 1977	1,000	22,900
		August 13, 1979	16,000	42,400

Table 3-5. Existing Relative Risk in Class I Stream Watersheds

VCU	Name/ADF&G Stream No.	Miles of Road	Stream Crossings	% Watershed Harvested	UnBuffered Miles	Buffered Miles
Anita	Duckbill/107-30-10760	3	2	8%	0.2	0.3
Anita	Goose Lakes/107-30-10780	2	4	1%	-0-	0.1
Anita	Fishtrap/107-30-10810	-0-	-0-	<1%	0.6	-0-
Anita	107-30-10840	-0-	-0-	6%	-0-	-0-
Anita	Starfish	1	2	1%	-0-	-0-
Mosman	Logjam/106-22-10060	12	21	13%	4.6	-0-
Mosman	Pump/106-22-10080	6	4	4%	0.6	0.7
Mosman	Wetbeck/106-22-10100	1	2	4%	0.2	0.7
Burnett	016-22-10130	1	-0-	1%	-0-	-0-
Burnett	016-22-10140	1	-0-	3%	-0-	-0-
Burnett	Detailer/106-22-10148	-0-	-0-	<1%	0.2	-0-

Recreation

Recreation Opportunities

The Recreation Opportunity Spectrum (ROS) is a recreation resource inventory aid which rates an area as to its ability to provide a certain type of recreational setting. It identifies for recreationists the type of experience they can expect to find in an area. Recreation opportunities are described in terms of eight different classifications. The ROS for the entire Wrangell Ranger District has been determined and a portion of that information is used in this analysis.

Only five of the ROS classes have been identified within this analysis area (see Map 3-8, opposite). The acreage within each of the ROS classes is listed in Table 3-6.

The ROS shows the largest opportunity class within the analysis area to be designated "semi-primitive non-motorized" (SPNM). This is due to the remote and unroaded condition of most of the analysis area. The areas of SPNM are undeveloped and removed from the sights and sounds of motorized uses and access.

In contrast, the "semi-primitive motorized" (SPM) areas are also unroaded but not so removed. The sights and sounds of motorized equipment are evident from beyond the area. SPM is the second largest opportunity class. This is due to the extensive salt water access around the analysis area. Motorized boat traffic occurs along the shoreline extending around the area and within the area in Anita Bay and Burnett and Mosman Inlets.

There is also motorized vehicle traffic on the existing Forest Road system within the "roaded modified" (RM) area. The RM is the fourth largest opportunity class and shows the portion of the analysis area where roads have been constructed and trees have been harvested.

The areas designated "primitive" (P1 & P2) are the third largest opportunity class in the analysis area. These areas are very remote with no development or facilities. These are generally the high elevation areas within the analysis area far removed from the evidence of man's activity.

Table 3-6. Acres of National Forest Land by Recreation Opportunity Spectrum (ROS) Class

ROS Class	Acres
Primitive 1 (P1)	13,429
Primitive 2 (P2)	55
Semi-Primitive Non-Motorized (SPNM)	22,619
Semi-Primitive Motorized (SPM)	19,539
Roaded Modified (RM)	11,491

Olive Cove Recreation Cabin



Recreation Places

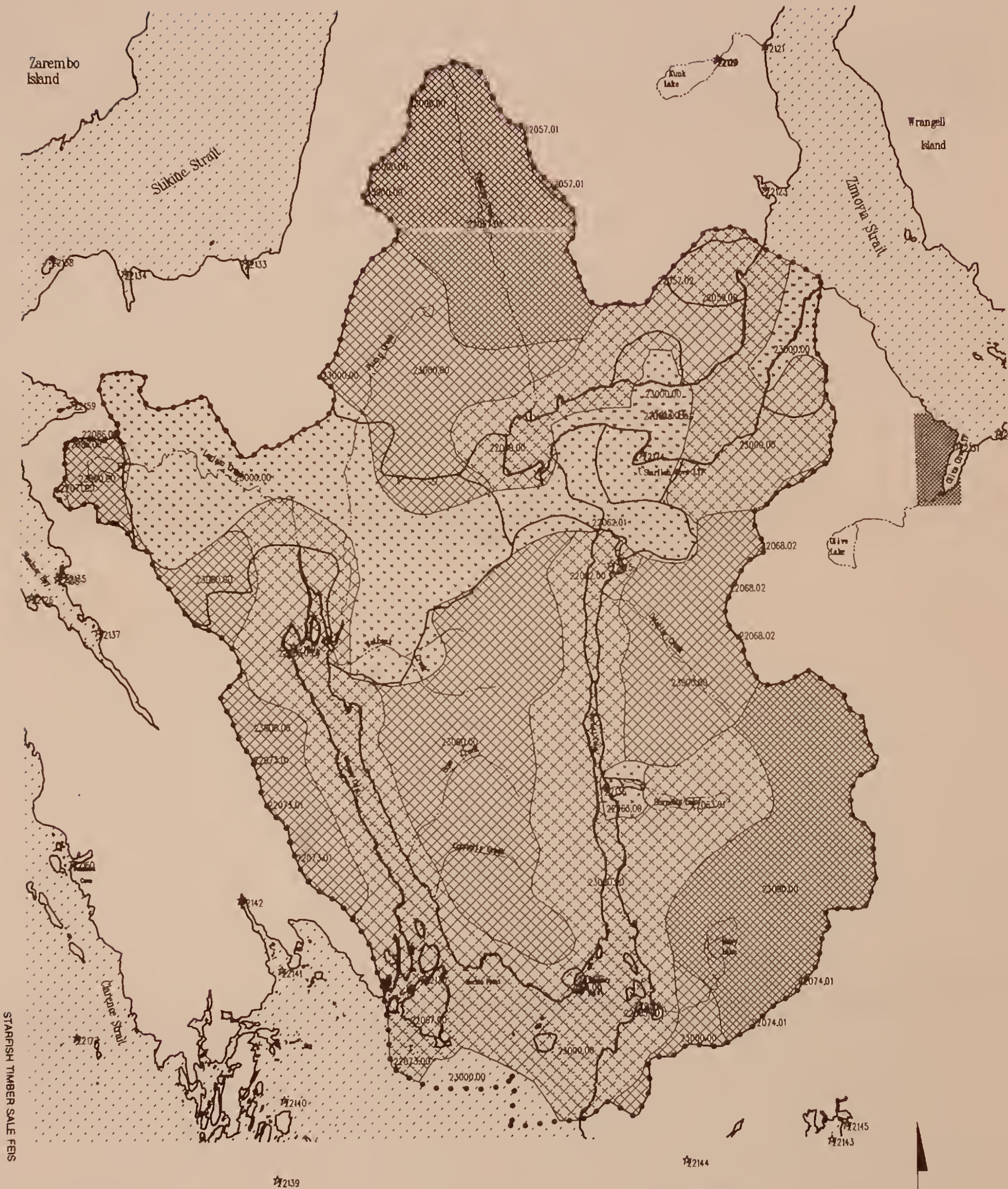
Recreation Places are sites where recreational activities are known to occur. All the places have a natural feature which draws people to the area. All the known Wrangell Ranger District recreation places, developed and undeveloped, have been inventoried, and a portion of that information is used in this analysis.

A variety of recreation forms occur throughout most of the analysis area. Most of the places on North Etolin are currently undeveloped and are centered around an anchorage. Ten recreation places, all undeveloped, have been identified within the analysis area, and sixteen more are on north Etolin outside the area. Outside the analysis area, there are three developed recreation places. These are the Steamer Bay recreation cabin, and the Kunk Lake shelter and trail. Table 3-7 is a listing of the known recreation places on north Etolin Island along with their known recreation major activities. There may be more places and activities than those listed.

Table 3-7. Recreation Places and Major Activities on North Etolin Island

Recreation Place	Major Activities
--Within the analysis area	
1. Head of Burnett Inlet	Anchorage, power boat use, big game hunting, waterfowl hunting, scenery site
2. Burnett River and Lake	Anchorage, scenery site, power boat use, stream fishing, big game hunting, scenery site
3. Cannery Cove	Anchorage, scenery site, power boat use, big game hunting
4. Navy Creek	Anchorage, scenery site, power boat use, stream fishing, big game hunting
5. Mosman Islands	Anchorage, power boat use, beach-combing, big game hunting
6. Head of Mosman Inlet	Anchorage power boat use, stream fishing, big game hunting, waterfowl hunting
7. Virginia Bay	Anchorage, big game hunting, waterfowl hunting
8. Starfish Cove	Boating site, power boat use
9. Head of Anita Bay	Stream fishing, big game hunting, waterfowl hunting

Map 3-8. Inventory R.O.S.



STARISH TIMBER SALE FEIS

LEGEND

- | | |
|----------------------------------|-------------------|
| Major Streams | X Not a ROS |
| Study Area Boundary | RM Roded Modified |
| Shoreline | Other Ownership |
| P Primitive | REC-SITE |
| SPM Semi-Primitive Motorized | |
| SPNM Semi-Primitive Nonmotorized | |

MAPSCALE 1:100000

1 0 1 2 3 4 Miles

SCALE is 1 INCH = 1.58 MILES



**Table 3-7. Recreation Places and Major Activities on North Etolln Island
(continued)**

**--Outside the analysis area but on N.
Etolln**

10. Olive Lake	Lake fishing, big game hunting
11. Kunk Creek and Lake	Trailhead, recreation shelter, hiking, stream fishing, lake fishing, recreation shelter use, big game hunting, viewing scenery, lake fishing, dispersed camping, mountain/ice climbing
12. Dog Salmon Creek	Power boat use, stream fishing, big game hunting, waterfowl hunting
13. Olive Cove & Snake Creek	Anchorage, power boat use, stream fishing, big game hunting
14. East Olive Cove	Anchorage, boating site, power boat use
15. McHenry Inlet & Hatchery L.	Anchorage, viewing wildlife, power boat use, stream fishing, big game hunting, lake fishing
16. Jadski Cove	Anchorage, viewing wildlife, power boat use, big game hunting
17. Three Way Passage	Anchorage, viewing scenery, power boat use, beachcombing, big game hunting
18. Rocky Bay & Streets Lake	Anchorage, power boat use, hiking, stream fishing, beachcombing, big game hunting, lake fishing
19. Lincoln Is.	Observation site - fish/wildlife, viewing wildlife
20. Johnson Cove	Anchorage, power boat use, viewing from marine access, beachcombing, big game hunting
21. Steamer Bay & Porcupine Cr.	Anchorage, recreation cabin, power boat use, stream fishing, beachcombing, recreation cabin use, big game hunting, waterfowl hunting
22. Kindergarten Bay	Anchorage, power boat use, beachcombing, big game hunting

**Table 3-7. Recreation Places and Major Activities on North Etolin Island
(continued)**

23. Quiet Harbor	Anchorage, power boat use, big game hunting
24. Egg Harbor	Anchorage, power boat use
25. King George Bay & Creek	Anchorage, power boat use, beach - related waterplay, stream fishing, pic-nicking, dispersed camping, big game hunting, waterfowl hunting
26. Honeymoon Creek	Beach - related waterplay, stream fishing, big game hunting

Lands

All of the land within the analysis area is part of the Tongass National Forest. The nearest non-federal land is at Olive Cove. Both State and private land occur at the head and along the north shore of the cove. The State of Alaska had selected about 524 acres and has disposed of a portion of this land to the public. Currently there are about six homes/cabins developed on the private lands.

The Forest Service, through various agreements and permits, establishes uses and sets priorities for National Forest lands. A special use permit grants to the holder, for a fee, certain rights and privileges within the National Forest. Although these agreements in themselves do not preclude other Forest Service activities, they need to be recognized and considered when doing analysis for a project planning.

There are eleven permitted special uses and two memorandums of understanding for activities and sites on North Etolin Island. Seven of these are within the analysis area. These uses need to be recognized and considered during this analysis process. Table 3-8 below is a listing of the current and pending special uses and memorandums of understanding on North Etolin Island.

**Table 3-8. Permitted Special Uses and Memorandums of Understanding on
North Etolin**

Permittee Cooperator	Use and Location
--Within the analysis area	
1. Alaska Aquaculture Inc. Burnett Inlet Fish Hatchery	Fish hatchery site on Burnett Inlet which also uses Burnett Lake as a freshwater source for brood stock & hydropower.
2. Mosman Joe Oysters	Oyster farm at Mosman Island.
3. Southeast Management & Trading Company, M/V Observer	Outfitter/guide with permitted use at Anita Bay.
4. Angling Adventures, M/V Star Queen	Outfitter/guide with permitted use of entire Etolin Island

Table 3-8. Permitted Special Uses and Memorandums of Understanding on North Etolin (continued)

5. USDA Forest Service	Electronics Site in the Keating Range.
6. Alaska Power Authority, Tyee Hydro-electric Project	Electronics Site on Navy Peak.
7. State of Alaska, Department of Fish & Game	Memorandum of Understanding for an aluminum fish pass and maintenance/storage cabin on Navy Creek.
--Outside the analysis area but on N. Etolin	
8. Robin Larsson	Oyster Farm at Three Way Passage.
9. John Nielson	Oyster Farm in Rocky Bay.
10. All Aboard Yacht Charters	Outfitter/guide with permitted use in Steamer Bay.
11. Alaska Seacoast Charters, M/V Discovery	Outfitter/guide with permitted use at Snake, Kunk and Streets Creeks.
12. Julian J. Gustin, dba Alaska Charter Service	Outfitter/guide with permit pending for use at Olive Cove.
13. USDI National Marine Fisheries Service	Memorandum of Understanding for a research camp and a fish weir at the head of Steamer Bay.

Minerals

An inventory of mineral development potential was conducted by the US Bureau of Mines, Alaska Field Operations Center, Juneau Branch, during 1989. This inventory indicated no areas of high mineral development potential within the analysis area or on Etolin Island.

The Bureau of Land Management (BLM) Mining Activity Report, dated October 3, 1988, indicates no mineral claims within the analysis area. The report indicates that a number of mineral claims had been filed with the BLM, but all cases have either been closed with no conveyance or deemed abandoned and are void.

Cultural Resources

Cultural resources include the evidence of past human activity, potentially dating from the first occupation of southeast Alaska to the recent past. Information on the prehistory of the region is limited, and Etolin Island is poorly known. Some sites in the region, including the Ground Hog Bay site on the Chilkat Peninsula and the Hidden Falls site on Baranof Island, indicate the occupation of southeast Alaska dates to nearly 10,000 years ago. Evidence suggests Etolin Island was deglaciated and available for human use by at least 9,000 years ago, although no sites of that age have been documented.

The Stikinkwan Tlingit occupied Etolin Island at the time of Euroamerican contact. The Stikinkwan was the most prominent of all southern Tlingit groups, and next to the Chilkat, they were considered the most powerful and aggressive of all the Tlingit. Several clans of the Stikinkwan occupied small villages on Etolin Island. Their pattern of settlement changed abruptly, however, once the Russians constructed a fort at Wrangell in 1834. At that point, many of the local Tlingit groups abandoned their traditional sites and moved to or near Wrangell. Over the course of time, Tlingit people lost knowledge pertaining to the locations of traditional sites.

Aboriginal site types known to occur on Etolin Island include villages, middens, camps, fish weirs, forts, culturally modified trees and petroglyphs.

The Etolin Canoe (PET-089) is the only site in the analysis area listed in the National Register of Historic Places. This site has a protective buffer and will not receive impact. No other sites are listed on or considered eligible for the National Register.

The first documented historical activity on Etolin Island consisted of construction of a fish hatchery on McHenry Inlet in 1882. Other fishing-related development included a saltery at Olive River and McHenry Inlet and a cannery at Canoe Pass and Burnett Inlet. Other historical development included fox farms on and adjacent to the island and commercial logging which began by at least 1917. The north shore of Etolin Island saw intensive use for trapping fur bearers, and there are sites associated with this activity.

Cultural resource inventories on Etolin Island have been conducted on a reconnaissance level by Sealaska and the USDA Forest Service. Sealaska Corporation contracted for an archaeological-historical survey of the region to locate historical and cemetery sites for selection under Section 14 (h)(1) of the Alaska Native Claims Settlement Act. This effort resulted in the identification of three sites on Etolin Island, although Sealaska did not submit any of these for consideration under 14 (h)(1). Forest Service inventories have been carried out, primarily in association with project activities. A total of 48 sites have been identified on Etolin Island as a result of these inventories. A detailed cultural resource overview of Etolin Island, entitled "The Bitter Water People: A Cultural Resources Overview of Etolin Island, Southeast Alaska" has been prepared under contract to the Forest Service and is available for review at the Stikine Area Supervisor's Office.

Visual Resource

Etolin Island is a scenic area of great landscape diversity. Landforms consist of high, glacier-scarred rocky mountains separated by flat-floored muskeg valleys or deep fiords. The lower parts of most valleys are "drowned," forming many bays and long inlets. Vegetative cover ranges from muskeg through low deciduous, dense conifer, to sub-alpine and alpine varieties.

Landscape Character

Map 3-9. Seen and Non-Seen Areas



LEGEND

- Major Streams
- Study Area Boundary
- Shoreline
- SEEN AREA
66 percent
- NOT SEEN
34 percent

MAPSCALE 1:100000



SCALE is 1 INCH = 1.58 MILES



Map 3-10. Inventory Visual Quality Objectives



LEGEND

- Major Streams
- Study Area Boundary
- Shoreline
- Retention 3 percent
- Portion Retention 42 percent
- Modification 45 percent
- Max. Modification 10 percent



Map 3-11. Inventory Visual Management Classes



STARRISH TIMBER SALE FEIS

LEGEND

- Major Streams
- Study Area Boundary
- Shoreline
- VMC 1
- VMC 2
- VMC 3
- VMC 4

MAPSCALE 1:100000



SCALE is 1 INCH = 1.58 MILES



STARFISH TIMBER SALE FEIS



MAPSCALE 1:100000



Prepared by
a.wilson

Sensitive Viewpoints

The *western side* of the analysis area is viewed from Clarence and Stikine Straits. These are designated high visual sensitivity travel routes, being frequently used by the Alaska Marine Highway System and by commercial and recreational vessels. Ferries and cruise ships using Clarence Strait typically view the analysis area in the background distance zone (4 miles +). Smaller vessels pass within the foreground (0 to 1/2 mile) or middleground (1/2 to 4 miles). Navy Peak is the most dominant landform seen from Clarence Strait. Upon entering Stikine Strait, views of the analysis area are limited to scattered glimpses in the middle and background; the foreground and close middleground are outside the analysis area.

Anchorage in or within view of the analysis area on Etolin's western shoreline include McHenry Inlet, McHenry Anchorage, Cannery Cove, Quiet Harbor, and Steamer Bay. The first three are designated as medium visual sensitivity; the last two as high visual sensitivity. A Forest Service recreation cabin is located in Steamer Bay but offers no clear views into the analysis area.

The *eastern side* of the analysis area is viewed from Zimovia Strait. Frequently used by local fishing and recreational vessels; Zimovia is designated a high visual sensitivity route. Vessels traveling this route view the landscape as middleground.

Anita Bay, with its higher concentration of commercial use than recreational use, is designated a medium sensitivity route. A Forest Service-owned LTF is located at Starfish Cove in Anita Bay, with a logging camp nearby. Rising above timberline, Virginia Peak attracts viewer interest as the highest landform seen from within the bay. This peak is also the main focal point for persons boating northward up Burnett Inlet. Anita Bay is used as an anchorage when wind conditions permit.

Individuals traveling north-south *by air* frequently fly along Zimovia Strait or follow a Burnett Inlet/Anita Bay route. These air routes are designated medium visual sensitivity, and landforms seen as middleground were included in the mapping process.

Seen Area

Approximately 66 percent of the analysis area is seen from the travel routes and recreation sites described above (see Map 3-9, page 3-29). Broken down by VCU, 71 percent of the Anita Bay VCU (464), 48 percent of the Mosman Inlet VCU (467), and 82 percent of the Burnett Inlet VCU (468) are seen from high or medium visual sensitivity travel routes.

Visual Quality Objectives

Visual Quality Objectives (VQO's) are standards for managing visual change in the landscape. They suggest varying degrees of acceptable modification based on viewing distance, landscape character, and viewer interest in scenic quality. In areas of high scenic value and high viewer interest, VQO's of "partial retention" and "retention" suggest managing for little or no visible change in the landscape. VQO's of "modification" and "maximum modification" indicate the area is rarely seen or is relatively low in scenic value, and change would not be noticeable or of great social consequence. "Inventory" VQO's are objectives reflecting only the visual resource concerns in a given area and do not incorporate timber or other resource values. The inventory VQO's may or may not be met by the selected alternative. Selection of the alternative includes the decision of whether or not to meet inventory VQO's.

Map 3-10(opposite) identifies inventory VQO's for the analysis area. Approximately 45 percent of the entire analysis area is mapped as "retention" and "partial retention". These VQO's primarily occur on land viewed from visually sensitive travel routes where the landscape character attracts interest. The remainder of the analysis area, approximately 55 percent, has been mapped as "modification" or "maximum modification". See Table 3-9, below, for a breakdown of VQO's by VCU.

Table 3-9. Percent of VCU and Analysis Area in Each VQO

VQO's	VCU 464 Anita	VCU 467 Mosman	VCU 468 Burnett	Analysis Area
Retention	8%	1%	2%	3%
Partial Ret.	46%	23%	59%	42%
Modification	44%	51%	39%	45%
Maximum Mod.	2%	25%	0%	10%

Visual Management Classes

Visual Management Classes (VMC's) identify areas where greater care may be needed in designing management activities that won't conflict with visual quality objectives. VMC's combine VQO and landscape character data (such as percent slope) to identify the relative ease with which VQO' may be met given certain ground conditions.

Map 3-11 (opposite) identifies VMC's for the analysis area. Approximately 49 percent of the entire analysis area -- 75 percent of the seen area -- is mapped as VMC's 1 and 2, the most sensitive seen area. Proposed activities which overlap these VMCs will need extra attention during project design. VMC's 3 and 4 indicate areas where inventory VQO's will be easier to meet or where management activities are not likely to be seen. See Table 3-9 for a breakdown of VMC's by VCU.

Table 3-10. Percent of VCU and Analysis Area in Each VMC

VMCs	VCU 464 Anita	VCU 467 Mosman	VCU 468 Burnett	Analysis Area
1	14%	9%	19%	14%
2	33%	23%	47%	34%
3	47%	18%	33%	31%
4	6%	50%	1%	21%

Existing Visual Condition

Related to the issue of how easily change may be visually absorbed by a landscape is the existing visual condition. Previous change can make additional change less noticeable if activities were well designed. If they were not well-fitted to the landscape, previous activities may prompt a negative public reaction to further change.

Map 3-12 (page 3-34) shows where past management activities within the analysis area are still visible from sensitive travel routes. These impacts, affecting 23 percent of the analysis area, are related to the Quiet and Granite Timber Sales, the Anita Bay log transfer facility and logging camp, Burnett Lake hatchery, logging and cannery activities around Cannery Cove, and A-frame harvesting adjacent to Anita Bay. Seven existing harvest units are seen from Anita Bay, two from the head of Burnett Inlet and four from the head of Mosman Inlet. At this time, resource management activities have altered approximately 27 percent of the seen area in the Anita Bay VCU, 7 percent of the seen area in the Mosman Inlet VCU, and 5 percent of the seen area in the Burnett Inlet VCU. Negative cumulative effects are likely to be greatest in areas where existing modifications overlap with more sensitive VMC's 1 and 2, and with proposed new activities.

Soils

In upland soils typical of the Starfish analysis area, tree rooting is generally very shallow, with most of the roots present in the surface organic layers and the upper few inches of mineral soil. For three reasons, surface organic layers are highly important for tree growth. First, the trees have shallow roots, second, surface organic layers have relatively high concentrations of plant nutrients, and third, organic layers rarely become dry during the growing season.

Soil productivity and nutrient status can be influenced in a number of ways by timber management activities. Much of the nutrient value of these soils is in the upper organic-rich layers, so any destruction or removal of these layers will have a severe, adverse effect on tree growth. This removal can result from landslides, surface erosion, severe burning, severe yarding disturbance, or from displacement by roads, skid trails, landings, or rock pits. These soils can also be damaged by compaction or puddling which impairs soil drainage and therefore reduces productivity. Conversely, productivity can also be enhanced where timber management activities improve soil drainage.

Most undisturbed soils in the Starfish analysis area are very resistant to surface erosion. Thick layers of surface organic matter and surface mats of vegetation act as protective covers that minimize surface erosion. Locations vulnerable to surface erosion and landslides exist, however, including stream banks, snowslide or avalanche slopes, and V-notches.

Soil mass movement is the dominant process of natural erosion in southeast Alaska. Many landslides occur during or immediately after periods of heavy rainfall, when soils are saturated. Particularly hazardous areas are steep slopes that have soils with distinct slip-planes, such as compacted glacial till or bedrock sloping parallel to the surface. These areas have a high likelihood of mass movement, especially if disturbed by blasting of rock pits or road pioneering, side casting of excavated material, or logging practices that cause substantial surface disturbance.

Vegetation, particularly tree roots, seems to have a stabilizing effect on slopes. Tree roots tend to decrease significantly in strength five to seven years after the tree is cut. This decrease in soil holding capability results in an increased likelihood of soil movement on steep slopes following clearcutting. Further, the displaced roots of uprooted trees can disturb the soil mantle whenever windthrow occurs. Under natural conditions, windthrow is an important triggering device of debris avalanches and flows in southeast Alaska.

Recent research on landslides in southeast Alaska (Swanston 1989) has concluded that although over 90 percent of all landslides in the past 20 years were not related to logging or roads, logging and roads do increase the potential for landslides in a given site.

A planning level stability analysis of the analysis area is based on the Soil Resource Inventory of Etolin Island. Landslide hazard classes are used to group soil map units that have similar properties regarding the stability of natural slopes. Three classes--high, moderate, and low--rank soil units according to their relative potential for landslides. Table 3-11 (page 3-33) shows the amount of each hazard class in the analysis area. Map 3-13 (page 3-37) shows the distribution of high hazard soils within the analysis area.

Table 3-11. Distribution of Soil Hazard Classes Within the Analysis Area

Soil Hazard Class	Acres	Percent of Area
Low	26,376	40%
Moderate	27,362	40%
High	13,393	20%
TOTAL	67,131	100%

Wetlands and Floodplains

The Etolin analysis area, like much of Alaska, has an abundance of wetlands. About 42 percent of the area is classified as wetlands. These include muskegs, estuaries, freshwater sedge meadows, forested wetlands, alpine wetlands, and freshwater lakes and ponds (see Table 3-12). The distribution of these wetlands is shown on Map 3-14, page 3-40.

There are 475 acres of floodplains within the analysis area; 370 acres of this is forested.



Fishtrap Creek--Anita Bay

Table 3-12. Distribution of Wetlands Within Analysis Area

Wetland Type	Acres
Muskeg	11,583
Freshwater Meadow	104
Estuaries	103
Forested Wetland	7,129
Alpine Wetland	8,756
Lakes & Ponds	441
Total	28,116

Watershed

Drainage Basin Description

The Etolin Island analysis area includes portions of 75 watersheds whose streams terminate at saltwater, creating a watershed analysis area of about 57,400 acres. The Alaska Department of Fish and Game (ADF&G) has indicated that 19 of these 75 watersheds contain streams used by anadromous fish. These ADF&G watersheds total about 39,600 acres. Table 3-13 on the next page illustrates some of the characteristics of a few of the watersheds in the Etolin analysis area.

Map 3-13. High Hazard Soils



STARFISH TIMBER SALE FEIS

Map 3-14. Wetlands



LEGEND

- Major Streams
- Study Area Boundary
- Shoreline
- Forested wetland
- Muskeg
- Esturine
- Alpine Meadow
- Freshwater Meadow
- Lakes and Ponds

MAPSCALE 1:100000



SCALE is 1 INCH = 1.58 MILES



Table 3-13. Brief Descriptions of Some of the Etolin Analysis Area Watersheds

Watershed Name or Description	Area in Acres (sq. miles)	Total Stream Length (miles)	Drainage Density (mi./sq.mi.)
Logjam Creek	6,685 (10.44)	23.19	2.22
Detailer Creek	2,075 (3.24)	9.52	2.94
Pump Creek	5,526 (8.63)	18.85	2.18
Smallest Watershed	29 (0.04)	0.19	4.16
Largest Watershed	6,685 (10.44)	23.19	2.22
Smallest Drainage Density	264 (0.41)	0.63	1.52
Largest Drainage Density	133 (0.21)	1.54	7.43

These figures are determined from the Stikine Area geographic information system database. Drainage density is a measure of the total inventoried stream length in a basin divided by the basin area. Higher drainage densities indicate a watershed is more "dissected" than another, and therefore the risk that erosion processes will successfully deliver sediment to a stream channel is greater. On the Stikine Area, typical drainage densities range from less than one to greater than 10 miles of stream per sq. mile of watershed, with a median value of 2.8. The Etolin watersheds have a median drainage density of 3.16.

These catchments receive a range of annual precipitation from 80 inches in coastal areas (mouth of Anita Bay) to in excess of 160 inches in the high elevation areas east of Burnett Inlet. Approximately 65 percent falls between September and February. Runoff processes produce average annual discharges on the order of 6 to 7 cubic feet per second (cfs) per square mile. Two-year peak flows of 110 cfs per square mile may occur, usually associated with intense October storms, or early spring rain-on-snow events. Summer low flows of one cfs per square mile are possible, but are not considered potential impediments to fish passage and spawning success. Stream temperatures are expected to remain within anadromous fish limits year-round.



Portage Creek

Channel Classification

Stream channels on the Tongass National Forest have been classified and mapped using channel types--a physically based system which allows for comparing channels of similar form and function. A description of the physical characteristics and management considerations of the approximately 38 channel types is provided in *Channel Types Field Guide: A Guide to Stream Mapping Units on the Tongass National Forest Chatham Area* (R10-MB-6), which is currently being revised. Channel types have further been grouped by the stream processes which formed them, reflecting the long term interaction of geology, landform, climate, and resultant vegetation patterns. These process groups explain the basic interrelationships between the runoff, sediment transport, and vegetation patterns of channels so management guidelines and practices developed for each process group would consistently address the various management concerns of the different types of channels.

For this level of timber sale project planning, process groups were further grouped according to two most basic management concerns. These include 1) streambank stability--alluvial channels on floodplains and fans, and some portions of mixed-control channels; and 2) sideslope stability--V-notches of varying depth and other channels where streambank stability is less a concern. For the management purposes considered here, a sideslope is that length of ground from the bankfull channel to the first major slope break above bankfull. The distribution of inventoried streams in the watershed analysis area is given in Table 3-14.

The majority of streams are mostly stable, being well-contained in bedrock-controlled channels (80 percent; see Table 3-14). Some of these stable channels, particularly in headwaters areas, are adjoined by unstable side slopes with a high risk of failure. Examples include steep slopes and V-notches, regardless of slope length. Mass wasting events on these sites are, by far, the greatest sediment producers in the sediment budgets of SE Alaska watersheds (Swanston 1969; 1989). Instream sediment erosion and transport processes will quickly move this material, since shear stresses in the bed material can be an order of magnitude greater in high-gradient contained channels than in lower-gradient and floodplain channels. These channels are therefore managed to maintain sideslope stability. Additionally, despite their bedrock nature, local areas of stream banks may be quite sensitive to disturbance. Being contained, most of these channels can route higher flood flows without overtopping their banks. These streams are able to easily transport silt, sand, and material the size of large cobbles.

A smaller portion of streams (20 percent, Table 3-14) are alluvial, dependent on riparian vegetation and woody debris for stability, and sensitive to stream bank, stream bed, and floodplain disturbance. These channels include portions of the mainstem and valley tributaries located lower in the watershed, which are managed for streambank stability. Annual flows (a frequency of once per year) may go over stream banks onto floodplains, fans, and terraces, with the opportunity to both scour backwater or side channels and deposit sediment and nutrients. At higher flows these streams will easily move large gravels, as well as sand and silt particles. More detailed descriptions of the process groups can be found in Appendix D.



The Head of Olive Cove

- ¹ **Low Gradient Floodplain** - These channels generally have a rich, abundant community of fish due to good spawning gravels and large wood for good rearing habitat.
- ² **Mixed Control Moderate Gradient** - These channels provide excellent rearing habitat due to large wood accumulations in the streams.
- ³ **High Gradient Contained** - These are the smaller, steep, bedrock channels either at high elevation or draining directly into salt water. Fish use of these streams or tributaries is very low.

Map 3-15. Watershed Boundaries



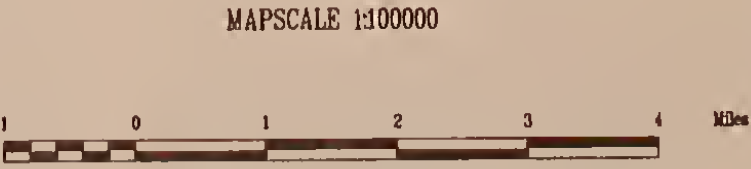
Map 3-16. Stream Network



LEGEND

- Study Area Boundary
- ~ Shoreline
- ~ MANAGED FOR SIDESLOPE STABILITY
- MANAGED FOR STREAMBANK STABILITY

⊠ LAKES



SCALE is 1 INCH = 1.58 MILES

Table 3-14. Distribution of Channel Type Process Groups on the Etolin Analysis Area (all watersheds, including those with ADF&G anadromous fish streams)

Managed For	Process Group	Stream Length (mi)
Streambank Stability	1. Low Gradient Floodplain ¹	13.2
	2. Alluvial Fan	2.9
	3. Mixed Control Moderate Gradient ²	29.0
	7. Placid or Glide	2.8
	8. Estuary	2.3
		<hr/> 50.2
		= 20% of stream length
Sideslope Stability	4. Large Low Gradient Contained	4.9
	5. Moderate Gradient Contained	9.5
	6. High Gradient Contained ³	181.6
		<hr/> 196.0
		= 80% of stream length

Map 3-15 (page 3-41) shows the watershed boundary map for the Etolin Island analysis area with only the ADF&G anadromous stream network. Map 3-16, opposite, shows the entire stream network grouped into two broad management concern classes, whether streambank stability, or sideslope stability.

Timber

The Etolin Island analysis area has undergone a recent inventory which included soil surveys, careful aerial photo analysis, and field verification. This information was combined to estimate the quantity of operable CFL on the area. Volume class and operability determinations were based on the soil type, soil productivity, aerial photo analysis, and ground review.

The inventory was put into a computer database and used in this Etolin Island analysis. It is considered to be the most accurate and representative inventory available for the Etolin Island analysis area. Map 3-17 (page 3-40) shows the location of the total CFL based on the Etolin analysis inventory. Table 3-15 displays the comparison of total CFL to operable CFL acres by volume class and VCU.



Loading at the Sortyard

Table 3-15. Comparison of Total CFL to Operable CFL Acres by Volume Class and VCU

VCU	Volume Class	Total CFL	Operable CFL
464 Anita	3	432	432
	4	4,526	677
	5	4,913	3,145
	6	553	553
467 Mosman	3	1,002	1,002
	4	8,263	2,808
	5	5,332	2,747
	6	1,150	1,150
468 Burnett	3	77	77
	4	8,604	2,951
	5	4,592	3,512
	6	864	864
TOTALS		40,308	19,918

The Etolin Island analysis area is part of the coastal temperate rainforest. For a detailed description of the timber and vegetation characteristics, see the Southeast Alaska Area Guide, the Forest Ecosystem of Southeast Alaska (Volumes 7 and 9), Preliminary Forest Plant Associations of the Stikine Area, and the Final Environmental Impact Statement for the Tongass Land Management Plan.

The Starfish analysis area covers approximately 67,131 acres. The area is composed of approximately 14,213 acres of nonforested land and 52,918 acres of forested land. Of this forested land, approximately 12,610 acres are noncommercial forest and 40,308 acres are commercial forest land. The commercial forest contains approximately 20,390 acres of inoperable commercial forest, which is not available for timber harvest. The remaining 19,918 acres of operable commercial forest are available for timber harvest.

Forest in Southeast Alaska

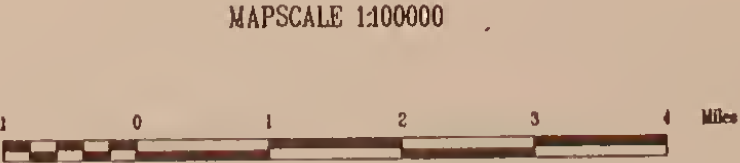


Map 3-17. Total CFL



LEGEND

- Major Streams
- Study Area Boundary
- Shoreline
- Existing Roads
- Inoperable CFL
- Operable CFL
- Existing Clearcuts



SCALE is 1 INCH = 150 MILES



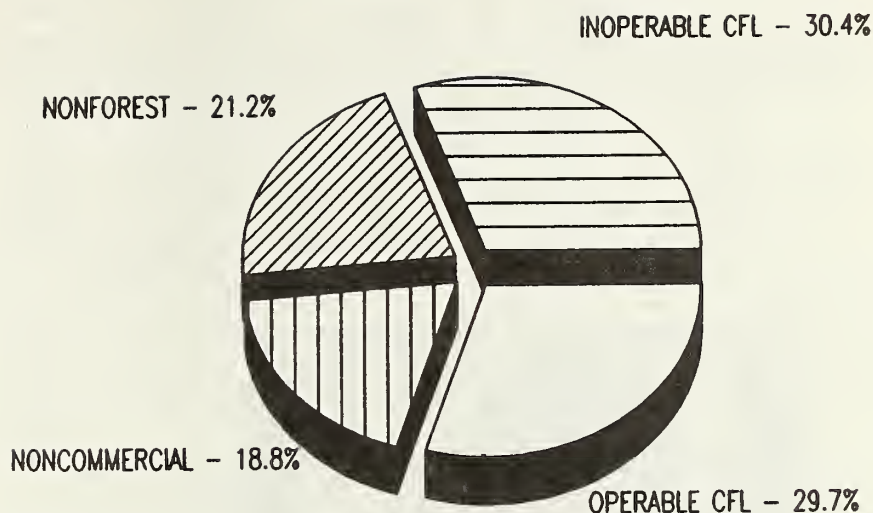


Figure 3-2. Land Base

The Starfish analysis area has large expanses of poorly-drained, low-productivity forested sites which cannot sustain commercial forest volume. The sites which can produce commercial forest timber have a moderate timber productivity. Generally, the Etolin area has low- to medium-volume timber stands on low- to moderately-productive growing sites. The higher volume stands are located on the better-drained sites along the streams and on the steeper mountain slopes. The lower volume stands occur on the poorly-drained sites and at the highest elevations. Indices used in southeast Alaska for measuring site productivity are site index and volume class. The Farr's 50-year site index calculated from the soil inventory shows that approximately 11 percent of the commercial forest land has a high site index (greater than 90). Approximately 63 percent has a moderate site index (70-90), and 26 percent has a low site index (50-69).

In the analysis area, approximately 13 percent of the operable commercial old-growth forest land in the study area is volume class 6 (30-50 MBF per acre), 47 percent is volume class 5 (20-30 MBF per acre), 32 percent is in volume class 4 (8-20 MBF per acre) and 8 percent is in volume class 3 (second-growth, less than 8 MBF per acre).

Table 3-16 displays the volume class distribution of the operable commercial old-growth forest land by acreage. Table 3-16 displays the volume class distribution of the operable commercial old-growth forest land by million board feet (MMBF) of timber volume.

Table 3-16. Acres of Operable Old-growth CFL by Volume Class

VCU	Volume Class 3	Volume Class 4	Volume Class 5	Volume Class 6	Total VCU
464	432	677	3,145	553	4,807
467	1002	2,808	2,747	1,150	7,707
468	77	2,951	3,512	864	7,404
Totals	1,511	6,436	9,404	2,567	19,918



Old-growth Forest

Table 3-17. Timber Volume (MMBF) on Operable Old-growth CFL by Volume Class

VCU	Volume Class 3	Volume Class 4	Volume Class 5	Volume Class 6	Total VCU
464	--	11	76	18	105
467	--	40	67	35	142
468	--	41	86	27	154
Totals	--	92	229	80	401

Commercial forest species include Sitka spruce, western hemlock, Alaska-cedar, western redcedar and mountain hemlock. Noncommercial forest species include lodgepole pine and alder.

The commercial forest stands on the area occur predominately as uneven-aged and over-mature old growth stands. A minor component of the commercial forest exists as even-aged stands of varying ages. These even-aged stands originated from timber harvest or from natural catastrophic windstorms.

The old-growth commercial forest has a general species composition averaging approximately 60 percent hemlock, 17 percent Sitka spruce, and 13 percent Alaska-cedar, and 10 percent redcedar. The species composition varies somewhat between the volume classes.

The old-growth forest stands are beyond the culmination of mean annual increment and have a high proportion of dead and dying trees. Wood defect and decay are estimated to affect up to 30 percent of the volume. Dwarf mistletoe is present on hemlock in most of the old-growth stands. Alaska-cedar mortality is present on the area and is part of the Alaska-cedar decline currently occurring throughout southeast Alaska.

Approximately 8 percent (1,486 acres) of the operable commercial forest land on the analysis area has been converted to second growth. All of the second growth stands have been certified as adequately stocked. The second growth stands exhibit vigorous growth and have a stocking range from a well-stocked to overstocked condition. Of the 1,486 acres of second growth, 680 acres have had silvicultural treatments to improve stand characteristics for timber and other resources. These treatments were 163 acres of burning, 441 acres of planting, and 76 acres of thinning.



Head of Burnett Inlet

Employment

The timber and fishing industries provide the majority of all jobs in the primary employment sector in southeast Alaska. A number of nearby communities could be affected by a timber sale in the area. In Wrangell, timber harvest and milling are the primary employers, followed by Federal, State, and local government, and seafood harvesting and processing. The Alaska Pulp Corporation sawmill is the town's largest employer, and tourism is an emerging industry. Ketchikan is the State's fourth largest city. Its economy, too, is based on timber, fishing, and tourism. In Meyers Chuck, most of the residents fish for a living. Thoms Place is a small settlement that is also dependent on fishing.

Transportation

The road system on Etolin Island evolved entirely from the harvest of timber products. Timber harvest and related National Forest management activities are the sole purpose of road development and management. The road system on Etolin Island is not linked to the inter-island transportation network of the Alaska Marine Highway system. Consequently, no recreational automobile traffic has occurred and none, other than the occasional off-road vehicle, is expected.

There are 23.2 miles of forest development road within the analysis area. There are an additional 10.5 miles of forest development road in the VCU's adjacent to the analysis area.

Table 3-18. Existing Forest Development Road by VCU

VCU Number	Location	Length (Miles)
464	Anita	6.8
465	Quiet	3.1
467	Mosman	14.6
468	Burnett	1.8
469	Olive	7.4
Total		33.7

Log Transfer Facilities

There is one existing log transfer facility (LTF) within the analysis area, located on the south shore of Starfish Cove, Anita Bay. (Anita Bay 1, Corps of Engineers permit #071-0YD-10800384, State ID FD200-81013004FP) This LTF was originally designed and constructed in 1983 for the Granite Timber Sale as a treated timber bulkhead with an A-frame lift-off system. The LTF was reconstructed in 1985 to a steel H-pile and timber bulkhead with a crane lift-off system. Repairs to increase the loading capacity on the bulkhead for larger cranes were completed in the spring of 1991. Approximately 53 MMBF feet of timber has passed over this facility.

Camps and Administrative Sites

There is one land-based logging camp and Forest Service administrative site at Anita Bay. The camp is active at this time. There is a native log barge loading/unloading facility and air taxi and boat dock on the north shore of Starfish Cove associated with this camp. (Anita Bay 2, Corps of Engineers permit #071-0YD-2-830191, State ID AK830707-12)

Chapter 4

Environmental Consequences

Chapter 4

Environmental Consequences

Introduction

The purpose of this chapter is to describe the physical, biological, economic, and social effects likely to result from each alternative. A summary of the consequences of each alternative is displayed in Table 2-2 at the end of Chapter 2. The information has been taken from more detailed reports that are available for public review in the planning record, located at the Forest Supervisor's Office, Petersburg, Alaska.

Adverse Environmental Effects Which Cannot Be Avoided

There are some adverse effects which cannot be avoided if any one of the action alternatives is selected.

Harvest in the Starfish analysis area would reduce the number of old-growth stands. As a result, the carrying capacity of the habitat will be reduced for old-growth-dependent species.

Ground disturbing activities such as stream crossings and culvert installation will temporarily increase silt loads in streams and tributaries within the analysis area. In addition, a small loss of fish habitat will occur at road crossings in those portions of fish habitat occupied by culverts.

Timber harvest and road construction will change the appearance of the landscape. The area where change will be most noticeable is from Anita Bay and from near the head of Mosman and Burnett Inlets. The effects will diminish as the vegetation grows back.

Short-Term Use Versus Long-Term Productivity

One of the major benefits of timber harvest is the increased growth rate of the new trees (regeneration). In old-growth climax stands, annual growth is offset by mortality so that net growth is zero (Hutchison and Labau 1975). In contrast, young-growth stands will produce, on a 100-year rotation on an average site, about double the cubic foot volume maintained in most old-growth stands (Taylor 1934). Each action alternative would improve the production of merchantable timber by converting old-growth climax stands to highly productive, even-aged, young-growth stands. In addition, production of merchantable wood can be further increased if, after the site is harvested and regenerated, the new stands are precommercially thinned.

Irreversible Loss of Resources

An irreversible loss is a permanent or long-term use of a resource that is not replaceable within a lifetime, including the destruction of a cultural site or consumptive use of minerals. In the Starfish analysis area, for example, cultural artifacts and cultural sites could be irreversibly disturbed as a result of the timber sale. Subsurface cultural sites that cannot be located with surface surveys are especially vulnerable. The harvest of old-growth timber within the Starfish analysis area is also an irreversible loss because the stands may take 200 to 300 years to develop and the commitment of this resource to timber harvest is reversible only over a long period of time.

Irretrievable Commitment of Resources

An irretrievable commitment is a decision that makes other choices unavailable during the life of the commitment. The decision cannot be retrieved for the time that has already passed, but could be changed in the future.

Timber harvest and road construction would irretrievably remove the opportunity to use those parts of the Starfish analysis area for primitive, unroaded recreation until the vegetation grows back. The construction of roads and the establishment of rock pits is also considered an irretrievable commitment that would reduce or eliminate soil productivity on those sites unless they are rehabilitated. The establishment of buffer strips around eagle nest trees, around cultural sites, and within Aquatic Habitat Management Units (AHMU's) makes these buffer areas unavailable for timber harvest.

Wildlife

The following consequences to wildlife resulting from implementing the proposed alternatives will be addressed in this final environmental impact statement:

A) Carrying capacity of Sitka black-tailed deer, black bear, marten, eagles and otter; B) the impact of projected changes on subsistence and sport harvest; C) whether or not NFMA direction on viable populations is being met; D) whether or not the alternatives meet current Forest Plan direction for old growth management (retention); E) the total acres of high volume old growth and the number and size of large old growth blocks remaining after harvest and how this relates to old growth dependent species.

Blue Grouse



Carrying Capacity

Habitat Suitability Index (HSI) models were used to estimate carrying capacity for Sitka black-tailed deer, black bear, marten bald eagles and river otter. Carrying capacity is the number of animals that the habitat in an area is able to support over time. The actual number of animals present at a given point in time may vary depending on unanticipated or unmeasurable variables such as severe weather, predation, hunter harvest or disease.

The models provide an objective method to evaluate habitat capability and to estimate the effects of timber harvest. Field inventories were conducted by Forest Service wildlife biologists during the summers of 1987, 1988 and 1990. Information collected was used to validate the model outputs and identify high use wildlife areas. Identified high use areas are shown on Map 3-6.

The models were used to estimate carrying capacity for each VCU for its original condition and for each alternative for Sitka black-tailed deer, black bear, marten, otter and bald eagle. The models were also used to determine the carrying capacity of the area for these five species at the end of the 100-year rotation, in order to display how this proposed activity fits with current management direction.

Sitka black-tailed deer

Optimum winter range for Sitka black-tailed deer is found in high volume old-growth timber stands at low elevations on south facing slopes. Small openings in the canopy of these stands allow enough sunlight to penetrate for browse production while the crowns of the larger trees intercept the snow, making this browse more available and facilitating movement. In natural openings as well as new (0-25 year old) clearcuts more forage is produced, but it is of lower nutritional value and is buried by deep snows in winter. In older (25-150) second-growth stands the crowns close in, providing snow interception, but no browse can grow in the dense shade. If these stands are thinned enough to maintain browse production, the snow interception ability is lost. Gap management is an experimental procedure being attempted to improve the value of second-growth stands. It involves the cutting of small (1/10th acre) openings in second growth stands with a few of the dominant trees left for snow interception. The value of this technique for all species of wildlife is still being evaluated. The reduced values for deer of new clearcuts and older second growth stands are reflected in the model.

Currently, the study area is capable of supporting 1,295 deer based on the HSI model and using the typical (moderate) winter scenario for the area. This is 3% less than the area could support prior to any timber harvest. As displayed in Table 4-1, for the first 25 years post harvest, the various alternatives further reduce the carrying capacity from 1% to 6%. As shown in Table 4-2, if the second growth stands aren't thinned, the carrying capacity will be further reduced from 2-3% for the period from 25 to 150 years post-harvest. This is not a significant decline in carrying capacity. Annual fluctuations due to weather changes will probably mask these projected changes in carrying capacity.

Table 4-1. Deer carrying capacity for the first 25 years after harvest of the various alternatives; as a result of past timber harvest (Alt. 5); and original (pre-timber harvest) condition. The numbers in parentheses are the percent decline over original condition.

	Original	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
VCU 464	392	324 (10%)	312 (13%)	310 (14%)	310 (14%)	345 (4%)
VCU 467	727	582 (11%)	515 (12%)	514 (11%)	516 (10%)	523 (2%)
VCU 468	393	229 (7%)	370 (6%)	372 (5%)	379 (4%)	382 (3%)
Total	1,334	1,206(10%)	1,196(10%)	1,198 (10%)	1,212 (9%)	1,295 (3%)

4 Environmental Consequences

Current forest plan direction calls for the harvest of all operable commercial forest land (CFL) by the end of the rotation except for those stands set aside for retention. At least 458 acres of operable CFL below 500-foot elevation have to be retained for deer winter range in their natural (old growth) condition. This is in addition to the inoperable CFL and any stands on deer winter range retained for other species. As described in Chapter 3, enough stands were tentatively identified for retention to meet current forest plan direction. The model was run on a scenario whereby all operable CFL that was not designated for retention was harvested. As can be seen in Table 4-2, this scenario results in a carrying capacity of 789 deer for the study area at the end of the rotation. This is a 41% decline over the original condition. The National Forest Management Act (NFMA) calls for revision of forest plans every 10 to 15 years, and our forest plan is currently being revised. Changes in direction could significantly change the carrying capacity for all species at the end of 100 years. Harvest of any of the alternatives proposed in this FEIS, in addition to past harvest, would result in approximately 15% of the decline predicted by forest plan. The rotation is 15-20 years into its cycle, so this puts us right on schedule with the forest plan.

Table 4-2. Deer carrying capacity from 25 to 150 years after harvest and at the end of the rotation (100 years) if current direction is followed. Numbers in parentheses are percent decline from original condition.

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	100 years
VCU 464	316 (12%)	303 (16%)	301 (16%)	300 (16%)	336 (6%)	223 (38%)
VCU 467	498 (14%)	495 (15%)	518 (11%)	507 (13%)	548 (6%)	359 (38%)
VCU 468	362 (7%)	367 (6%)	369 (5%)	376 (4%)	382 (3%)	207 (47%)
Total	1,176(12%)	1,165(13%)	1,187(11%)	1,183 (11%)	1,266 (6%)	789 (41%)

NFMA also directs that "fish and wildlife habitat shall be managed to maintain viable populations of existing native and desirable non-native vertebrate species in the planning area. A viable population is one which has the estimated numbers and distribution of reproductive individuals to insure its continued existence is well-distributed in the planning area." (CFR 219.19). As part of the process of revising the forest plan, the Tongass Land Management Plan (TLMP) Revision Team determined viable population levels for all management indicator species (MIS) by wildlife analysis area (WAA). The Starfish study area is part of WAA 1901 which encompasses the north half of Etolin Island and is illustrated on Map 3-1. The TLMP revision team determined that a viable deer population for this WAA is 500 animals. In its original condition, the study area supported 39% of the deer in this WAA. If it must also support 39% of the viable population, this would amount to 195 deer. All alternatives support many times this level and even the 100-year projection would support 5 times this level.

Most deer harvest in the study area is by residents of Wrangell, Olive Cove and Thom's Place (based on TRUCS data and local knowledge). TRUCS data also indicates that residents of Petersburg and Point Baker have hunted deer in the study area in the recent past, but there is no indication if they were successful harvesting deer. Because of the distance they would have to travel over often treacherous waters, it is unlikely that there is any significant deer harvest from the study area by residents of these two communities.

As described in Chapter 3, prior to the severe winters between 1969 and 1973, the deer population was much higher on Etolin Island. Even though the local human population and hunter demand has increased since the early 1960's, the hunter harvest has decreased from Etolin Island, probably due to low deer numbers and low chance of success, especially compared to other nearby areas. Recent harvest levels average 30 deer per year from all Etolin Island. During the period 1960-1968, prior to the severe winters, average annual harvest by Wrangell residents from all Etolin Island was 190 deer (Doerr and Sigman, 1986). Additional harvest by residents of other communities and non-residents probably brings this total historical harvest to approximately 200 deer. Alaska Department of Fish and Game (ADFG) estimates that 10% of the total deer population can be harvested annually on a sustained yield basis. Etolin Island is currently capable of supporting approximately 7,000 deer. Twenty-five years after harvest of the preferred alternative, the island would be capable of supporting approximately 6,800 deer. This population level could theoretically support an annual harvest of 680 deer or over 3 times the level of the 1960's and 23 times the current harvest level.

It is not known how much of the historical or recent Etolin Island deer harvest came from the study area. In its original condition the study area supported 19% of the deer carrying capacity of Etolin Island. Historically, probably more than 19% of the harvest came from the study area due to its proximity to Wrangell. Currently most harvest occurs on South Etolin where the deer population and chance of success are much higher. A 100-year projection was not run on all of Etolin Island due to time constraints and the lack of accurate information on acres of operable CFL and acres in the various retention categories. Part of South Etolin is now in wilderness and won't change over the rotation. If the assumption is made that the rest of the island which is available for harvest has the same percent decline over the rotation as the study area, this would result in a deer population on Etolin Island of approximately 4,880 animals. This population level could support an annual harvest of 488 animals or 2.5 times the level of the 1960's and 16 times the current level. This projection again assumes that management direction does not change over the next 100 years. It also assumes that the deer population is at 100% of the carrying capacity, which it currently is not.



Sitka Black-tailed Deer

River Otter

In southeast Alaska, river otters use forested habitats for denning along the coast and along streams inhabited by trout and salmon. Very little use is made of clearcuts and older second growth stands in these areas. Currently, the study area is capable of supporting 56 otter. This is 5% less than the area could support prior to timber harvest. All of the proposed alternatives further reduce the area's carrying capacity by 1 otter or 2%. This is not a significant decline in otter carrying capacity.

The TLMP Revision Team determined that a viable otter population for Etolin Island is 50 animals. The study area should be able to support 22% of this total, or 11 otter. A 100-year projection run for otter as described above for deer would result in a carrying capacity of 41 otter in the study area and 217 otter on all Etolin Island at the end of the rotation. This is nearly 4 times that needed to meet NFMA direction for a viable population for the study area and over 4 times that needed for the entire island. Again, this assumes that forest plan direction does not change during the next 100 years.

Black Bear

Black bears use a wide variety of habitats, but they are rarely found far from escape cover provided by dense forest. Young clearcuts provide more forage than old-growth forests due to increased berry production, but black bears mostly use the edges close to cover. As the second-growth stands become denser and taller, bears will use them for escape cover, but berry production is diminished or totally lost in the dense shade. Black bears in southeast Alaska mostly use hollow logs and trees for winter dens. If some of these are left in clearcuts they may provide some use for denning until they are lost to decay. For these reasons, new clearcuts have fairly high values for black bears but second growth stands (over about 25 years of age) have very little value.

Currently, the study area has the carrying capacity to support 114 black bears. This is 3% less than the area could support prior to any logging. Because of the high value of clearcuts, none of the alternatives cause a decline in black bear carrying capacity immediately post-harvest. After 25 years, the action alternatives cause a decline in black bear carrying capacity to 108 bears or an 8% decline over natural conditions.

Table 4-3. Black bear carrying capacity--originally, currently (Alt. 5) and as a result of the various alternatives for the first 25 years post-harvest and for the rest of the rotation (25 to 150 years after harvest). The numbers in parentheses are the percent decline from original condition.

	Alternatives 1 to 4				Alt 5
	Original	0 to 25 years	25 to 150 years	0 to 25	25 to 150
VCU 464	33	32 (3%)	30 (9%)	32 (3%)	32 (3%)
VCU 467	46	45 (2%)	41 (11%)	45 (2%)	43 (7%)
VCU 468	38	37 (3%)	37 (3%)	37 (3%)	37 (3%)
Total	117	114 (3%)	108 (8%)	114 (3%)	112 (4%)

Average black bear harvest from all Etolin Island over the last 5 years has been 4 bears per year. Black bear harvest has been increasing throughout Southeast Alaska in recent years and this increase is expected to continue. The harvest from Etolin Island has increased from 1-2 bears per year in the mid 1980's to 5-9 bears per year since 1987. It is estimated that 5% of the black bears can be harvested each year on a sustained yield basis. If this is correct, approximately 20 bears could be harvested annually from all Etolin Island and 6 bears could be harvested from the study area. This is 5 times the current harvest level. The study area had 28% of the carrying capacity of black bears for Etolin Island in its original, preharvest condition. It's unlikely that 28% of the harvest comes from the study area since many of the best hunting areas occur outside the study area.

A 100-year projection was run for black bears as described above for deer. This results in a carrying capacity of 83 bears for the study area at the end of the rotation. This is a 29% decline from the original carrying capacity. Using the same method to estimate carrying capacity for the entire island as described above for deer, Etolin Island should be able to support 340 bear at the end of the rotation. This population level could support an annual harvest of 17 bears, or 4 times the current harvest level.

The TLMP Revision Team determined that a viable population for game management unit 3 (GMU 3), which includes Etolin Island, is 125 black bear. The study area is only a very small percentage of this GMU, and yet, it would be able to support two thirds of the viable population for the entire GMU at the end of the rotation.

Marten

Marten use old-growth forests almost exclusively. This is where they find thier preferred prey species, suitable denning sites and hiding cover. Marten avoid large openings where they're susceptible to predation and their preferred prey species are not found in high numbers.

The study area is currently able to support 155 marten which is a 5% decline from the original carrying capacity. All of the alternatives would reduce the carrying capacity by an additional 4%. The average marten harvest from North Etolin Island from 1985 through 1989 was 11 marten. In 1989, 28 marten were harvested from the island. Annual harvest fluctuates dramatically, based on weather and on fur prices. The study area has 27% of the marten carrying capacity of Etolin Island. It is not known what percent of the annual harvest from Etolin Island comes from the study area. It is estimated that 40% of the marten population could be harvested annually. This means that the study area could support an annual harvest of 62 marten and the entire island could support a harvest of 240 marten.

Table 4-4. Marten carrying capacity as a result of past activities (Alt. 5), proposed harvest, and the original (pre-timber harvest) condition. The numbers in parentheses are the percent decline from original condition.

	Original	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
VCU 464	44	40 (9%)	39 (11%)	39 (11%)	39 (11%)	42 (5%)
VCU 467	69	61 (12%)	61 (12%)	63 (9%)	62 (10%)	64 (7%)
VCU 468	50	47 (6%)	47 (6%)	48 (4%)	48 (4%)	49 (2%)
Total	163	148 (9%)	147 (10%)	150 (8%)	149 (9%)	155 (5%)

A 100-year projection was run for marten as described above for deer. This results in a carrying capacity of 102 marten for the study area at the end of the--a 37% decline from the original carrying capacity. Using the same method to estimate carrying capacity for the entire island as described above for deer, Etolin Island should be able to support 470 marten at the end of the rotation. If the population were at carrying capacity, it would be able to support nearly 7 times the current harvest level.

The TLMP Revision team estimated that a viable marten population for the North Etolin Mangement Area (WAA 1901) would be 50 animals. The study area has 40% of the carrying capacity for this WAA, hence the study area should be able to support 20 of these animals at the end of the rotation. As stated above, following current direction, the study area would be able to support 5 times this level at the end of the rotation. The entire WAA would be able to support 152 marten at the end of the rotation or 3 times the viable population level.

Bald Eagles

In southeast Alaska, bald eagles nest in large trees in old-growth forests within 500 feet of salt water or the shores of major rivers and lakes. In the study area, their nests have only been found along salt water beaches. There are 44 documented eagle nest trees in the study area. These are displayed on Map 3-5.

There has been some historical logging of the beach fringe, reducing bald eagle carrying capacity by 12% to 89 eagles. Virtually all of the remaining beach fringe has been set aside in the development of alternatives for this timber sale, resulting in no further decreases in eagle carrying capacity. Some of the group selection units are shown going all the way to the beach, but no harvest is anticipated within 500 feet of the beach, which is where 95% of eagle nests are usually found. All existing eagle nests will have mandatory 330-foot, no cut buffers.

Current management direction sets aside most of the beach fringe in various retention categories. There should be very little additional reduction in carrying capacity over the rotation for the study area or Etolin Island as a whole. The carrying capacity is well within that needed to support a viable population.

Subsistence

The wildlife species which receive subsistence, sport or commercial harvest in the study area are deer, black bear, marten and marine mammals. There is no way to distinguish resident sport harvest of big game from subsistence harvest in southeast Alaska. Both types of harvest require a state sport hunting license and the appropriate tags or harvest tickets. The seasons, bag limits and methods of take are also identical for both types of harvest. Most big game harvest in the study area is by local residents, so could be categorized as either sport or subsistence. None of the proposed alternatives cause a significant reduction in the study area's carrying capacity for either deer or black bear.

Roads built to harvest timber can also facilitate harvest of big game. Traditional harvest occurred in the immediate vicinity of the beach. The existing road system on Etolin Island provides access to areas which were not traditionally hunted, adding areas and game populations for use by both subsistence and sport hunters.

**Subsistence
(Cont.)**

There may be some competition from loggers for big game during the life of the sale. It is expected that the loggers will concentrate their harvest along the road system where they have better access than along the traditional (beach fringe) hunting areas. Since the loggers will mostly be hunting in areas that were not traditionally used by local sport and subsistence hunters, there should be very little competition for the resources in the traditional use areas. There may be competition for game in the areas accessed by roads, but these are not traditional use areas. The projected carrying capacity as a result of harvesting any of these proposed alternatives is capable of supporting 4 times the historical harvest level of deer and 3 times the current harvest level of black bear. This should be more than enough to support the slight increase in annual harvest from non-local loggers. Many loggers are local residents and would be eligible for subsistence harvest in the study area. For these reasons, we don't feel that any of the proposed alternatives will have a significant adverse impact on subsistence harvest of big game from the study area.

Pine Marten

The taking of marten for either commercial or subsistence purposes requires a state trapping license, and all marten taken are required to be sealed. There is no distinction made in the records of whether the harvest is for personal or commercial purposes. The proposed alternatives only reduce marten carrying capacity by 2 to 5% from the current condition. This is not a significant decline and is still capable of supporting several times the current harvest level. The existing road system as well as the proposed additional roads increase the area that both commercial and subsistence trappers can harvest marten, benefitting both users. To date, reported harvest is well below the level that the marten population can support, so apparently the existing road system has not resulted in a great increase in harvest or a decline in the marten population. The additional roads proposed to be built with the preferred alternative should not result in increased harvest if existing road systems haven't. There should be no competition with the loggers for marten since marten are harvested in the winter when logging activities are usually shut down. For these reasons, we don't feel that harvest of any of these alternatives will have a significant impact on subsistence use of marten from the study area.

Only Alaska Natives can legally harvest marine mammals and all harvest of this type is considered subsistence. There are no records kept of the number of seals or sea lions harvested in southeast Alaska. Logging activities proposed in this EIS should have no direct impact on harbor seal or stellar sea lion populations in the study area. There are no new log dumps proposed, although there will be some direct watering of logs from some of the helicopter units. There will be no competition from loggers, since only Alaska Natives may legally harvest marine mammals, and very few of the loggers are Alaska Natives. For these reasons we don't feel that any of these alternatives will significantly affect the subsistence harvest of marine mammals in the study area.

4 Environmental Consequences

Large Forested Blocks

Individual drainages within the analysis area represent unique ecosystems. Existing clear cuts, proposed harvest units, muskeg, subalpine and beach were used as boundaries to define forest blocks remaining after harvest. A minimum block size of 1,000 acres was selected to represent wildlife species which are sensitive to habitat fragmentation. Large and numerous forest blocks would provide for greater viability and productivity for old-growth dependent species within the analysis area. Table 4-5 displays the difference in numbers, location, and size of forest blocks with the different alternatives. Blocks with much less than 1,000 contiguous, non-fragmented acres remaining with a given alternative were dropped from the list. Map 4-1 illustrates these blocks in their current condition. The average size of the existing blocks is 3,390 acres.

Average forest block size left uncut for this planning effort differs considerably by alternative. One of the large blocks was split into two blocks by Alternatives 1 and 2. In the long term perspective, there is little difference between alternative selection if management direction doesn't change for the next 100 years. However, in the near term, the maintenance of large blocks of old growth in Alternative 4 maintains a broader array of landscape management options for future land management planning.

Table 4-5. Forest Blocks Remaining by Alternative

Location of Forest Block	Acreage of Blocks by Alternative				
	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Fishtrap-N Anita Bay	5,050	3,895	3,970	3,390	5,100
NW Burnett	1,650	1,650	1,650	1,650	2,350
Detailer	1,110	1,200	1,930	2,250	2,250
E Burnett	5,250	5,250	5,250	5,250	5,250
SW Mosman to	3,680	2,550	5,725	5,825	5,825
SE Burnett	1,275	1,275	-	-	-
Wetbeck	935	1,680	1,115	935	1,800
NW Mosman	-	-	-	-	1,150
Number of blocks	7	7	6	6	7
Average Block Size	2,710	2,500	3,110	3,220	3,390



Head of Burnett Lake

Map 4-1. Existing Large Blocks of Old Growth



LEGEND

- Major Streams
- Study Area Boundary
- Shoreline
- Existing Large Blocks of Old Growth

MAP SCALE 1:100000



SCALE is 1 INCH = 1.58 MILES



Table 4-6. Estimates of Minimum Old Growth Patch Size to Achieve Optimum Population Levels

Management Indicator Species	Minimum Patch Size (acres)
Sitka black-tailed deer	1,000
Hairy woodpecker	500
Red breasted sapsucker	250
Marten	800*
Red squirrel	30
Brown creeper	15
Other Area-Sensitive Species	Minimum Patch Size (acres)
Goshawk	2,500
Marbled murrelet	600

*In the analysis of the management situation (AMS), 180 acres was listed as minimum patch size for marten. Recent literature since the AMS was published indicates that 800 acres is the minimum.

Retention

The current forest plan calls for some of the old-growth timber stands to be maintained in their original condition. There are several categories of retention, each with their own retention percentage. These percentages vary by land use designation (LUD) and are shown in Table 4-7. This table also shows how many acres occur in each value comparison unit (VCU) in each category, how many acres need to be retained, and how many acres remain after the harvest of each alternative. The only categories that are close to their retention acreages are the buffers around estuarine grasslands for bears and the beach fringes with low density eagle nests (less than 1 nest per mile of beach). In the LUD III VCU's (467 and 468) these categories have 85% retention percentages. There are some past harvest units in these zones of these VCU's. None of the alternatives in this FEIS propose harvest in these zones in these VCU's. For all of the other retention categories, all of the alternatives leave many more acres than is required under current direction. This, added to the retention of large blocks of old growth with the preferred alternative, leaves great flexibility to meet changes in old growth management direction in the future.



Canoe Pass--Zimovia Strait

4 Environmental Consequences

Table 4-7. Retention Acreages as directed by the current Tongass Land Management Plan.

		Original Acres	% to Retain	Acres to Retain	Acres Remaining				
Code	VCU				Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
41 bear beach	464	1,621	5%	81	1,496	1,02	1,516	1,513	1,554
	467	2,394	15%	359	2,290	2,284	2,290	2,299	2,299
	468	2,147	15%	322	2,048	2,048	2,048	2,048	2,048
42 bear est.	464	264	25%	66	264	264	264	264	264
	467	290	85%	247	248	248	248	248	248
	468	167	85%	142	146	146	146	146	146
43 bear rip.	464	278	10%	28	264	264	264	264	264
	467	437	20%	87	424	424	424	424	424
	468	281	20%	56	281	281	281	281	281
45 deer hi	464	5,674	5%	284	5,099	4,952	4,828	4,821	5,544
	467	5876	5%	294	4,754	4,946	5,050	4,963	5,518
	468	6519	5%	326	6,265	6,310	6,315	6,449	6,511
46 deer low	464	3696	5%	185	3,002	2,932	2,915	2,944	3,389
	467	6,874	5%	344	6,045	5,847	6,130	6,014	6,260
	468	4,235	5%	212	4,057	4,066	4,094	4,129	4,166
49 fur up	464	7,330	5%	367	6,285	6,060	5,922	5,964	7,220
	467	9,936	15%	1,490	8,295	8,296	8,628	8,452	9,177
	468	8,101	15%	1,215	7,784	7,836	7,872	7,975	8,036
50 fur bch	464	2,040	10%	204	1,816	1,809	1,806	1,801	1,930
	467	2,814	20%	563	2,504	2,497	2,552	2,525	2,601
	468	2,653	20%	531	2,538	2,540	2,537	2,603	2,641
51 land birds	464	9,370	5%	469	8,101	7,884	7,743	7,765	8,933
	467	12,750	5%	638	10,799	10,793	11180	10,977	11,778
	468	10,754	5%	538	10,322	10,376	10,409	10,578	10,677
52 water fowl	464	679	25%	170	633	633	633	633	633
	467	34	85%	29	34	34	34	34	34
	468	0	85%	0	0	0	0	0	0
56/57 lo eagle	464	531	15%	80	390	390	390	390	396
	467	1062	85%	903	967	967	967	967	967
	468	682	85%	580	584	584	584	584	584
58 hi eagle	464	370	100%	370	370	370	370	370	370
	467	268	100%	268	268	268	268	268	268
	468	511	100%	511	511	511	511	511	511
Total		32,874		11,900					

Code 41 Bear Beach Fringe: 1,000 foot beach fringe buffer. 5% to be retained in LUD IV, 15% to be retained in LUD III.

Code 42 Bear Estuary: 1,000 foot buffer around estuarine grasslands. 25% to be retained in LUD IV, 85% to be retained in LUD III.

Code 43 Bear Riparian: 500 foot buffer on both sides of anadromous fish streams 10% to be retained in LUD IV, 20% to be retained in LUD III.

Code 45 Deer Spring/Summer/Intermediate Winter: extends from low elevation winter range (Code 46) to alpine, hence equals operable CFL minus Deer Winter (Code 46); 5% to be retained in both LUD IV and III.

Code 46 Deer Winter (Low Elevation): beach fringe to 500 foot elevation. 5 % to be retained in both LUD III and IV.

Code 49 Furbearers Upland: Forested habitat excluding beach fringe/riparian (i.e. Code 50); hence operable CFL minus Code 50. 5% to be retained in LUD IV and 15% in LUD III.

Code 50 Furbearers Beach Fringe/Riparian: 600' buffer along intertidal zone; 500 foot buffer on both sides of major rivers and streams and around lakes. 10% to be retained in LUD IV, 20% in LUD III.

Code 51 Landbirds: Assorted forested habitats: Old/TLMP inventory indicated 100% of operable CFL fell into this category. 5% to be retained in both LUD III and IV.

Code 52 Waterbirds: Nesting, feeding, moulting and concentration areas; site specific. 25% to be retained in LUD IV and 85% in LUD III.

Code 56 and Code 57 Bald Eagle nests > 1 mile apart: 500 foot beach fringe buffer. 15% to be retained in LUD IV, 85% in LUD III. Code 56 (nests > 2 miles apart) and Code 57 (nests 1 to 2 miles apart) had the same retention factors and so were lumped together in this analysis.

Code 58 Bald Eagle nests <1 mile apart: 500 foot beach fringe buffer strip. 100% to be retained in all LUD's.

Fisheries

General

It has been extremely difficult to determine specific cause-and-effect relationships between some forest management practices and variations in salmonid populations. Wild, unmanipulated populations have been found to vary naturally as much as fifty percent due to climatic conditions, escapement, predation, and other variables. Some land management activities can result in masking some effects while compounding others, making it difficult to predict simple cause and effect in order to estimate quantitative changes in fish populations. However, various studies have determined some general and basic life stage needs of salmonids. These require management activities to reduce any potential adverse effects on fish populations.

The three primary deleterious effects that timber harvest and associated road development can have on fisheries are 1) contribution of sediment to streams from landslides and erosion of road surfaces and exposed soil; 2) expansion of the extremes in water temperatures due to canopy removal; and 3) removal of future sources of large woody debris by harvesting riparian trees.

Sedimentation

High levels of deposited sediment can cause decreased survival of salmonid eggs and alevins by reducing water flow through the streambed gravel, thereby suffocating the eggs or preventing the hatched alevins from emerging. Extremely high levels of sedimentation may also reduce available habitat for fish by filling pools and crevices in the streambed. Water turbidity has been found to cause a decrease in feeding rate and a greater tendency to leave rearing areas and migrate downstream.

Roads contribute sediment to streams by two primary pathways: mass failures or surface erosion. Mass failures are a part of the natural land-forming process. Acceleration of these events by management activities can be greatly reduced by avoiding those areas known to be prone to failure.

Factors affecting sedimentation by surface erosion include construction technique, road gradient, surface area, type of surfacing material, and traffic volume. The filtering capabilities of small streams play a very important role in determining the impact of road sediment on aquatic resources. Drainage points which discharge water and suspended sediment onto the forest floor distant from a defined channel contribute very little sediment load to streams.

Water Temperature

Although a limited increase in water temperature can be beneficial to fisheries in certain situations, great care must be exercised to consistently achieve the desired effect. Canopy removal adjacent to **riffle** sections can result in an increased level of fish food production due to increased sunlight penetration. Removal of streamside canopy adjacent to **pools** can elevate the average temperature of these low-velocity feeding and resting areas in summer and decrease the average temperature in winter. Canopy removal adjacent to **spawning areas** between pools and riffles can result in a number of effects, some desirable, some not, depending on the species, life history stage, and the effect itself, the worst of which could be the lowering of water temperatures to the point of developing anchor ice in the gravels where the eggs are developing.

Large Woody Debris Recruitment

Maintenance of the riparian canopy can be critical to ensuring a future source of (1) large woody debris (LWD) which provides structure for in-stream habitat, retaining nutrient-rich fish carcasses and leaves, and maintaining the integrity of channel structure and function, (2) shade for temperature-sensitive streams, and (3) a source of carbon for the stream energy budget.

Buffers

The Tongass Timber Reform Act of 1990 prohibits the commercial harvest of timber within a 100 foot or greater buffer zone on each side of all Class I streams and those Class II streams which flow directly into a Class I stream. The retention of a buffer zone is a law intended reduce risk to fisheries (and other wildlife). However, buffers are not without risk themselves, as they are subject to windthrow. A windthrown buffer has greater potential to cause even more severe damage to fish habitat than canopy removal, depending on channel type and fish species affected. To be effective in moderating stream temperatures and providing a future source of LWD, a buffer must be configured so as to be wind-firm. This is often accomplished by locating the length of the buffer parallel to the prevailing direction of storms and/or extending the buffer to a windfirm topographic boundary.

Risk

Consequences are measured by the degree to which there is a potential for damage to or loss of the resource. Recognized prudent management activities or best management practices (BMP's) (refer to R-10 Soil and Water Conservation Handbook, FSH 2509.22) are employed to eliminate direct effects to the greatest extent practicable within the context of management goals as defined by law, regulation, and administrative decision. In addition, the R-10 Aquatic Management Habitat Handbook (FSH 2609.24) provides state-of-the-art guidance for developing riparian management prescriptions to minimize water quality degradation and, subsequently, the risk to fisheries which would be presented by implementation of any of the action alternatives.

Crude measures of *relative*, not *absolute*, risk to fisheries include total length of roads and of buffered and unbuffered stream channel, and total number of stream crossings, and of acres of harvest within fish stream watersheds. Combined, these relative risk factors provide a means of comparing development alternatives with regard to potential impact on fisheries.

Existing Risk Common to All Alternatives

Due to past development activities, there remains existing risk in 9 of the 22 Class I fish stream watersheds, and 1 of the 8 Class II fish stream watersheds. Within these 10 fish stream watersheds, there exist 26 miles of road having 35 associated stream crossings as well as 1,490 acres of existing clearcuts. Associated with these existing clearcuts are 6 miles of unbuffered and 2 miles of buffered stream channels.



Fishing Along the Creek

Comparison of Alternatives

The alternatives are compared for their relative contribution of risk to fisheries in Figure 4-1, Fish Risk Factors. The information represented in the graph relates to activities past, proposed, and cumulative, within fish stream watersheds only, that is, watersheds possessing streams that are known or expected to be inhabited by salmon or trout.

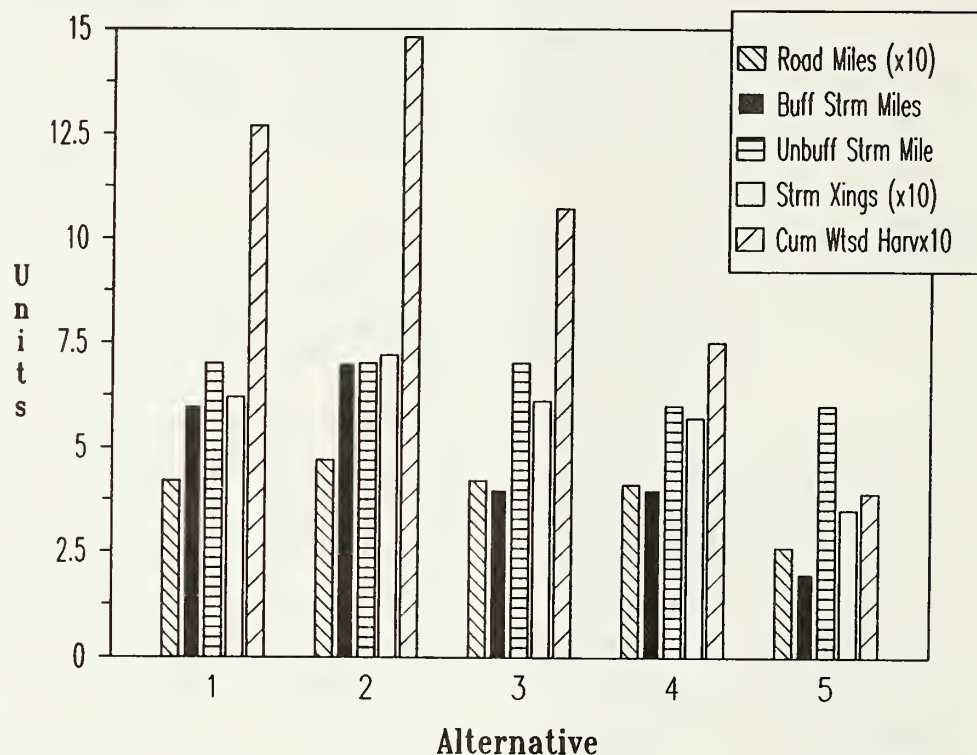


Figure 4-1. Fish Risk Factors

Interpreting Figure 4-1:

Alternative 1 would present risk, in terms of total existing and proposed amount of unbuffered fish streams, equivalent to Alternatives 2 and 3.

Alternative 2 would pose the greatest overall potential impact to fisheries in terms of the number of Class I and II watersheds entered and total existing and proposed road miles, stream crossings, and percent watershed harvest. From the data presented, this is the least desirable of the action alternatives because of its potential impacts to fisheries.

Alternative 3 would present the least risk among action alternatives to total existing and proposed streamside buffers.

Alternative 4 would pose the least potential impact to fisheries in terms of the number of Class I and II watersheds entered and total existing and proposed road miles, stream crossings, percent watershed harvest, and unbuffered fish streams. The risk presented by existing and proposed streamside buffers is only slightly greater than that presented by Alternative 3. This alternative appears, from the data presented, to be the most desirable of the action alternatives with respect to minimizing risk to fisheries.

Subsistence

For the most part, consequences of the alternatives to subsistence fish harvest is directly related to the relative risk of the alternatives to fisheries habitat. Little, if any, impact on the populations of marine species is expected. Competition for harvest would likely be short-term and would be from households temporarily located in the logging camp. However, the opportunity for harvest would remain and, in fact, would be expanded with the extension of the road system.



Beach on Mosman Inlet

Recreation

A number of consequences are common to all of the action alternatives:

1. The character of some recreation opportunities would change from undeveloped and primitive to modified and motorized. This is consistent with the area's LUD III & IV status. (See Table 4-8 on the next page for changes in recreational opportunity.)
2. The construction of additional roads would provide easier access for subsistence use, sport hunting, hiking, sport fishing, and for other recreation opportunities within parts of the area.
3. The carrying capacity for old-growth-dependent species would decrease, and with it, the likelihood of hunting success.
4. Motorized recreation opportunities would increase with the additional miles of roads constructed.

Alternative 5, the "no action" alternative would leave the existing mix of recreation opportunities unchanged. The analysis area would remain primarily unmodified (see Table 4-8). Motorized access and use would continue to be primarily along the existing roads and from the surrounding saltwater.

Alternatives 1, 3 & 4 would all build about the same amount of new road. Alternative 1 provides increased access south along Mosman Inlet. Alternative 3 & 4 provide new access along Fishtrap Creek but not south along Mosman Inlet. Alternative 2 builds the greatest amount of new road, providing access south along Mosman Inlet to Marble Point and along Fishtrap Creek.

Alternatives 1, 3 and 4 would all change the recreation opportunities in much the same way (see Table 4-8). They would all convert about the same number of recreation opportunities to "roaded" and "modified." Alternative 2 would convert the greatest area to a "roaded modified" recreation opportunity (see Table 4-8).

Cumulative Effects

All of the action alternatives would provide greater access to the area and shift the nature of the recreation experience from "primitive" to "roaded modified". The area would probably be used slightly more than in the past for recreation purposes.

Table 4-8. Changes in Type of Recreational Opportunity.

Recreation Opportunity	Acres per Alternative				
	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Primitive	7,054	7,054	7,054	7,054	13,484
Semi-Primitive, Non-Motorized	20,297	15,012	19,840	20,585	22,618
Semi-Primitive, Motorized	15,606	15,164	16,797	16,753	19,538
Roaded Modified	24,174	39,801	23,440	22,739	11,491

Cultural Resources

Cultural resource sites within the analysis area may contain significant information on past environmental conditions and human lifeways, possibly including information related to past conditions along the north Pacific Rim. These sites are both fragile and non-renewable. Primary impacts can include alteration to the settings of sites; alterations of above ground objects, features and structures, as well as the spatial relationships among them; and disturbance or destruction of subsurface cultural deposits. Secondary impacts may include a higher frequency of site vandalism due to increased access from constructed roads.

Federal laws and regulations (particularly the National Historic Preservation Act of 1966, as amended; Executive Order 11593; and the American Indian Religious Freedom Act of 1978) require a process, specified in 36 CFR 800, for considering the impacts of Federal projects on cultural resources. In brief, this process outlined in Section 106 of the National Historic Preservation Act, involves inventorying the resources, determining which are significant or eligible for inclusion on the National Register of Historic Places, evaluating project effects, and designing and implementing measures to negate any adverse effects that projects may have upon significant resources. The process is undertaken in consultation with the Alaska state historic preservation officer (SHPO) and possibly the Advisory Council on Historic Preservation.

The known sites in the analysis area are surrounded by protective buffer strips and will not receive impact. It is more difficult, however, to predict the effects on sites that have not yet been identified. Ground disturbing activities can damage these sites. The area of ground disturbance in each alternative is displayed in Table 4-9.

Table 4-9. Ground-Disturbing Activities

	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Road Miles	26	35	26	25
Acres of Possible Ground Disturbance (Timber Harvest Areas)	1,798	1,954	1,671	1,701

Generally, those alternatives which favor more development pose a greater threat to undiscovered cultural resources. An examination of Table 4-9 indicates that Alternative 3 offers the greatest chance of damaging undiscovered sites, followed in descending order by Alternative 2, Alternative 1 and Alternative 4. The "no action alternative", by its very nature, would constitute the least threat to cultural resources.

This assessment differs, however, when the location of ground disturbance is compared to the Tongass National Forest cultural resource probability model. A set of environmental variables (elevation, slope, etc.) is utilized to predict a high, medium or low probability for cultural resources. Generally, all ground disturbance within the high and medium probability zones is targeted for an intensive field inventory. When ground disturbance is placed within the context of the cultural resource probability model, Alternative 4 poses the greatest threat to cultural resources, followed in descending order by Alternative 3, Alternative 1 and Alternative 2.

Table 4-10. Cultural Resource Probability Zones

	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Acres in High Probability Zone	299	134	455	301
Acres in Medium Probability Zone	428	520	273	626
Acres in Low Probability Zone	1,071	1,300	943	774

Before logging and other ground disturbing activities are undertaken in the selected alternative, Forest Service personnel will apply the probability model to inventory cultural resources. The Forest Service will evaluate the significance of any discovered cultural resources, determine potential project impacts and design and implement necessary specific measures to negate any effect on significant cultural resources. Such measures could include relocating or redesigning some timber management activities to avoid disturbing cultural resources, protecting sites through the use of physical barriers, and recovering scientific data or otherwise documenting sites that cannot be avoided or protected. Mitigation measures and an inventory strategy will be designed in consultation with the Alaska state historic preservation officer (SHPO) to negate adverse project effects on significant cultural resources.

Etolin Canoe



4 Environmental Consequences

Cumulative Effects

Impacts from decay, natural landscape changes and development pose a threat to the preservation of significant cultural resources in the analysis area. Future timber development combined with other ground disturbing activities could result in a loss of cultural resources. Because little inventory has been conducted in the analysis area, it is impossible to determine the exact number and nature of cultural resources that are potentially threatened by future development. Implementation of field inventories and various mitigation measures will reduce the potential loss by preserving significant sites and by providing data on those that cannot be preserved.



Petroglyphs Found in Zimovia Strait

Visual Resource

All of the action alternatives satisfy the basic TLMP direction for visual resource management described in Chapter 3 (page 3-1) of this document. However, recreation opportunities or potential related to the enjoyment of scenery from some areas mentioned in Chapter 3 would be modified with harvest. Both Mosman and Burnett Inlets would be affected, with the greatest impacts likely to occur in Mosman Inlet (Anita Bay was not specifically recognized in TLMP as needing special protection for its recreation potential).

Consequences Common to all Action Alternatives

- Group selection helicopter units would likely meet a visual quality objective (VQO) of "retention" or "partial retention"; units may be noticeable (particularly in winter) but would appear as natural patterns.
- Generally, the impacts of the helicopter-logged clearcuts would be fewer than those associated with the cable-yarded units. Fewer roads would be necessary and more vegetation would be left standing after harvest.
- In most cases, road segments would be visible only where they pass through clearcuts. Roads along south Anita Bay are likely to be visible from the bay in only a few short stretches, but would likely be noticeable from Zimovia Strait.

Alternative 1

This alternative would have visual impacts on Zimovia Strait, Anita Bay, the head of Burnett Inlet, the head of Mosman Inlet, and the eastern side of Mosman Inlet. Refer to Map 4-2.

In **Anita Bay**, nine units would be visible in the middleground viewing distance (units 101 thru 107, and 114 thru 116). The upper portion of unit 124 would be seen in the background. Within-stand modification, (internal exclusions and unit boundary modifications) would be incorporated into three units, (101, 114 and 115) as shown in the unit cards, in order to meet the inventory visual quality objective (VQO) of "modification."

One unit (101) would be viewed in the middleground from **Zimovia Strait**, and five units would be seen in the background (103 thru 107). Unit 101 has potential to be viewed from Nemo Point southward along Zimovia, but is likely to meet inventory VQO's with the incorporation of within-stand modification.

From the head of **Burnett Inlet**, six units would be seen in the middleground viewing distance (113, 114, and 108 thru 111). Within-stand modification would be incorporated into two units, (113, 109). Unit 114 was previously discussed with Anita Bay impacts. The combined effects of existing and proposed harvest around the head of this inlet are likely to result in a visual appearance of "maximum modification," while the inventory recommends "modification." Unit 113 has potential to cause the greatest visual impacts.

From **Mosman Inlet**, one unit (131) would be seen in the foreground and five units would be seen in the middleground (129, 132, 133, 135 and helicopter unit 142). Two units would be viewed in the background from the head of Mosman (117 and 124). Within-stand modification would be incorporated into two units (135 and 142). Unit 135 has potential for high visual impact due to its size, steep slopes and proximity to the inlet. The entire unit is likely to be seen, and may not meet the inventory VQO of "modification." Cumulative impacts of past and proposed harvest along Mosman would likely result in a visual appearance of borderline "modification/maximum modification."

From Stikine Strait, a portion of helicopter unit 139 may be visible for a short time in the background, but would likely be meet inventory VQO's.

Road impacts unique to this alternative: Sections of the road extending from unit 131 in Mosman Inlet to unit 135 would be seen from Mosman. A particularly difficult section between units 131 and 132 would likely result in exposed rock fill along perhaps a third of this distance.



Etolin Island Creek

4 Environmental Consequences

Alternative 2

This alternative would have a visual impact on Anita Bay, the head of Burnett Inlet, the head of Mosman Inlet, the eastern side of Mosman, and Marble Point. Refer to Map 4-3.

In **Anita Bay**, 11 units would be visible in the middleground viewing distance (units 201 thru 207, 211, 212, 217 and 218). Four of these (203, 211, 212 and 217) would incorporate within-stand modification as shown on unit cards to meet the inventory VQO of "modification."

Two units (201 and 202) may be seen in the middleground from **Zimovia Strait**, and four would be seen in the background (204 thru 207). Inventory VQO's would likely be met by these units.

From the head of **Burnett Inlet**, three units would be seen in the middleground (208, 209 and 211). Small portions of unit 210 might be visible as well. Within-stand modification would be incorporated into two of these units (208 and 209); the third (211) was previously mentioned in the Anita Bay discussion. The combined visual effects of past and proposed harvest would likely meet a VQO of "modification". In **Mosman Inlet** and off **Marble Point**, nine of the eleven proposed units would be seen in the middleground viewing distance (units 234 thru 239, 231, 232, and helicopter unit 246). One unit (230) would be seen in the foreground. Unit 219 would be seen in the background from the head of Mosman Inlet; two existing units are visible in the same area. Within stand modification would be incorporated into four of these proposed units (238, 235, 234 and 246).

The combined effects of past and present harvest would likely result in an appearance of borderline "modification/maximum modification", while the inventory recommends "modification". Unit 234 has potential for high visual impact due to its size, steep slopes and proximity to the inlet, and is not likely to meet inventory VQO's.

Road impacts unique to this alternative: Impacts of road construction would be similar to those described for Alternative 1. Roads south of unit 234 would likely be visible only where they cross a harvest unit.

Alternative 3

This alternative would have visual impacts on Anita Bay, Zimovia Strait, the head of Burnett Inlet and the head of Mosman Inlet. Refer to Map 4-4.

In **Anita Bay**, 11 units would be visible in the middleground viewing distance (units 301 thru 307, 311, 312, 318 and 319). The higher elevations of unit 327 would be seen in the background. Within-stand mitigation would be incorporated into six of these units (301, 302, 305, 311, 312 and 318) as shown on the unit cards, to meet an inventory VQO of "modification."

Portions of unit 301 would be seen in the middleground from **Zimovia Strait**, and three other units would be viewed in the background (305, 306 and 307). Unit 301 has potential to be viewed from Nemo Point southward along Zimovia, but would likely meet inventory VQO's.

In **Burnett Inlet**, portions of four units would be seen in the middleground (308 thru 311). Within-stand modification would be incorporated into three of these (309, 310 and 311). Combined impacts of past and proposed harvest would likely meet the inventory VQO of "modification" in the middleground.

In **Mosman Inlet**, helicopter unit 338 would be seen in the middleground and unit 331 would be seen in the foreground. Two units would be seen in the background (327 and 320). Within stand modification would be incorporated into unit 338 to meet a "modification" VQO.

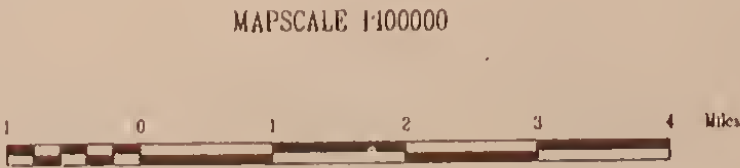
Road impacts unique to this alternative: No additional impacts.

Map 4-2. Alternative 1 Seen Area
62 percent of entry seen



LEGEND

- Major Streams
- Study Area Boundary
- Shoreline
- Proposed Group Selection
- Proposed Clearcut
- Existing Clearcut
- Sensitive Seen Area VMC 1 & 2



SCALE is 1 INCH = 1.58 MILES



Map 4-3. Alternative 2 Seen Area 64 percent of entry seen

26 ■ CHAPTER 4
STARFISH TIMBER SALE FEIS



LEGEND

- Major Streams
- Study Area Boundary
- Shoreline
- Proposed Group Selection
- Proposed Clearcut
- Existing Clearcut
- Sensitive Seen Area VMC 1 & 2

MAPSCALE 1:100000



SCALE is 1 INCH = 1.58 MILES



Alternative 4

This alternative would have a visual impact on Anita Bay, Zimovia Strait, the head of Burnett Inlet and the head of Mosman Inlet. Refer to Map 4-5.

In **Anita Bay**, seven units would be seen in the middleground viewing distance (units 401 thru 406 and 411). The size of units 401 through 403 have a potential to create a visual condition of "maximum modification." Five units would incorporate within-stand modification (401, 402, 403, 405 and 406) as shown in unit cards, to meet an inventory VQO of "modification." One setting would be deferred in unit 403. Unit 419 would be seen in the background from both Anita Bay and Mosman Inlet.

Unit 401 would be seen in the middle ground from Zimovia Strait and units 402, 403, 404 would be seen in the background. Unit 401 has potential to be viewed from Nemo Point southward along Zimovia. Within-stand modification as discussed above would likely allow these units to meet inventory VQO's.

In **Burnett Inlet**, unit 405 would be seen in the middleground viewing distance, and would receive within-stand modification as indicated previously in the Anita Bay discussion. An appearance of "modification" would likely result from the combined effects of past and proposed harvest.

In **Mosman Inlet**, two units would be seen in the middleground (425 and helicopter unit 433). Within-stand modification would be incorporate into unit 433. Three units would be seen in the background (412, 419 and 420). Because of their proximity to two existing large, square-shaped units, within-stand modification would be incorporated into for all three proposed units to lessen their cumulative impact. Combined effects of past and proposed harvest would likely produce an appearance of "modification" in the background, and borderline "modification/maximum modification" for the middleground view of Wetbeck drainage.

Road impacts unique to this alternative: No additional impacts.

Alternative 5

This alternative would retain the analysis area in its present visual condition. Existing harvest units seen from Anita Bay and the heads of Mosman and Burnett Inlets would have more time to visually recover before the next entry. Taller second growth in these units would help the next entry meet inventory VQO's.



Etolin Island From Zimovia Strait

4 Environmental Consequences

Cumulative Impacts with Future Entries

The long, fiord-like inlets of this analysis area provide unique viewing opportunities for a large percentage of the land base. With so much of the landbase visible, screening harvest activities with topography becomes difficult. In the case of this analysis area, nearly 80 percent of the operable CFL is visible from saltwater travel routes.

Past harvest in these three VCU's (Granite and Quiet sales) has removed about 25 percent of the nonseen operable CFL. This proposed entry is likely to remove another 30 percent, leaving less than half of the total to last through the end of this rotation. Approximately seven more timber sales of similar acreage to this entry could occur in this analysis area over the next 80 to 90 years to remove much of the remaining operable CFL. Clearly the nonseen operable CFL is not likely to last through this rotation as a means to minimize the impacts of clearcutting. In fact, if the next two sales average 50 percent visible (as would be true of this entry), the remaining nonseen operable CFL would be removed. The following five sales would be 100 percent visible, meaning all or part of every harvest unit would be seen from saltwater.

If inventory VQO's are to be met on the steep, highly visible slopes of this analysis area in the future, within-stand modification and careful unit shaping will likely be the most effective methods to use. Helicopter logging would also reduce visual impacts, requiring less roading, and allowing more creative unit shapes. These techniques tend to increase the logging costs to the operator and cost to the government of sale design, preparation, and administration. Once units are harvested, they would appear green within five years. Young trees would normally be tall enough to cover the exposed trunks of adjacent mature stands within 40-50 years. Within 50-60 years, harvested units would not likely be noticeable to a casual observer, meeting a visual quality objective of "retention".



North Etolin Seen From Turn Island Anchorage

Map 4-4. Alternative 3 Seen Area
54 percent of entry seen



LEGEND

- Major Streams
- Study Area Boundary
- Shoreline
- Proposed Group Selection
- Proposed Clearcut
- Existing Clearcut
- Sensitive Seen Area VMC 1 & 2

MAPSCALE 1:100000



SCALE is 1 INCH = 1.58 MILES



Map 4-5. Alternative 4 Seen Area 46 percent of entry seen

30 ■ CHAPTER 4



LEGEND

- Major Streams
- Study Area Boundary
- Shoreline
- Proposed Group Selection
- Proposed Clearcut
- Existing Clearcut
- Sensitive Seen Area VMC 1 & 2

MAP SCALE 1:100000



SCALE is 1 INCH = 1.58 MILES



Soils

The risk of impact on soils from timber harvest is often rated in terms of soil hazard classifications. Soil hazard classes reflect the probability of soil movement resulting from logging or road building activities. The probability is related to a number of factors such as soil strength, soil wetness, and slope. The soils in the low hazard class are found on 0 to 35 percent slopes. They are mostly stable in the natural setting and have little probability of soil movement if disturbed. Moderate hazard soils are generally found on 35 to 75 percent slopes. They are relatively stable in the natural setting but the probability of movement increases if they are disturbed. The soils in the high hazard class are usually found on slopes greater than 75 percent. They often creep or slide in a natural setting and are extremely prone to soil movement if disturbed. Consequences from timber harvest are related to the number of acres harvested and the soil hazard class on which the trees are growing.

Timber Harvest and Soil Hazard Class

Table 4-11 shows the area of land in each hazard class that would be harvested for each alternative. This data is based on the Soil Resource Inventory for Etolin Island. Field verification included an analysis of the risks of landslides and an evaluation of the potential impacts to other resources. Some changes in design and configuration of units and roads resulted from this on-site investigation.

Table 4-11. Area Harvested by Soil Hazard Class (Acres)

Soil Hazard Class	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Low	523	682	492	674	0
Moderate	1195	1183	1119	1013	0
High	80	89	60	14	0
Total	1,798	1,954	1671	1,701	0

Road Building

Road building impacts are related to the length of road constructed and the soil hazard class in which each segment is built. Table 4-12 shows the miles of road in each hazard class for each alternative.

Table 4-12. Total Miles of Road Proposed by Soil Hazard Class

Soil Hazard Description	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Low	12.8	18.6	15.8	15.1	0
Moderate	13.1	15.9	10.9	8.9	0
High	0.1	0.2	0.1	0.1	0
Total	26.0	34.7	26.8	24.1	0

4 Environmental Consequences

Cumulative Effects The range of time required for potentially unstable areas to restabilize varies greatly. Some unstable areas can stabilize in as little as three to five years while others require more time. While some become chronic sources of sediment, any slides or slumps in the analysis area are expected to recover relatively quickly.

Wetlands and Floodplains

Since a large amount (about 42 percent) of the Starfish timber sale area is classified as wetlands, they are not considered a scarce resource. Resource values associated with these wetlands varies greatly depending on the type of wetland, proximity to water bodies, landscape position, etc. Alternatives were designed to minimize potential impacts to identified high value areas rather than to avoid development on all areas classified as wetland.

The potential impact to wetlands is indicated by the amount of forested wetlands proposed for harvest (Table 4-13), and the amount of specified road proposed to be built on areas classified as wetland (Table 4-14).

Timber Harvest and Wetlands

Alternative 4 would harvest the greatest amount of forested wetlands, followed by Alternative 2 and Alternative 3. Alternative 1 would harvest the least.

Table 4-13. Timber Harvest on Forested Wetlands

Harvest on Wetlands	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Acres of Forested Wetlands	183	205	200	225	0
Percent of Forested Wetlands	2.6%	2.9%	2.8%	3.2%	0
Percent of Total Wetlands	0.6%	0.7%	0.7%	0.8%	0

Roads and Wetlands

The wetland vegetation, soil drainage or hydric character of a wetland will not be measurably altered by road construction except for the width of the roadfill itself. This is normally about 24 feet wide and amounts to approximately 2.9 acres per mile of road.

Alternative 1 would result in somewhat less road construction on wetlands than Alternatives 2, 3, or 4.

Table 4-14. Proposed Road Construction on Wetlands

Roads on Wetlands	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Miles of Road	7.5	9.1	9.5	9.1	0
Acres Covered	22	26	28	26	0
Percent of Specified Roads on Wetlands	29%	26%	36%	38%	0

Floodplains

The executive order dealing with floodplains was largely intended to prevent the construction and occupancy of floodplains so that flood events would not destroy property and cause loss of life. Given that a timber sale would not encourage people to build structures or live in floodplains, no effects are anticipated.

Cumulative Effects

To date, 194 acres of forested wetlands have been harvested and 13 miles of road has been built on wetlands. The additive effects of each alternative is presented in Table 4-15.

Table 4-15. Cumulative acres of wetlands impacted

	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Acres of Road	59	64	65	64	37
Acres Harvested	377	399	394	419	194
Percent of Wetlands	1.6%	1.6%	1.6%	1.7%	0.8%

Watershed

The exact impacts of a timber harvest and related road building on water quantity and quality are largely a function of complex relations involving many diverse watershed features. However, several indicators allow for reasonable estimation of adverse risk to watershed, stream, and water quality. Some of these factors follow:

1. The length of stream channels near harvest units (within about 100 feet) that have banks and/or sideslopes sensitive and susceptible to damage.
2. The number, length and type of roads built, and the number of stream and riparian area road crossings required.
3. The cumulative proportion of area harvested in a watershed, with consideration given to its overall "sensitivity" based on factors including soil erodibility, stream stability, and drainage density.
4. Mitigation measures applied, including best management practices (BMP's), forest plan guidelines, and site specific prescriptions.

Length of Affected Stream Channels

Risk of water quality degradation increases with the amount of near-stream harvest, and risk is greater where both sides of a channel are affected. Buffer strips, when implemented to protect sensitive banks and riparian areas, reduce this risk considerably; still, streams are at risk to increased sedimentation in the event of windthrow. Table 4-16 summarizes stream lengths that would receive potential impacts from harvesting units near streams in a given alternative. Data are expressed in terms of the management concerns mentioned in Chapter 3--sideslope stability (V-notches and areas where streambank composition minimizes bank stability concerns) and streambank stability (alluvial channels and similar areas where most (not all) buffer strips may be implemented). Data are also differentiated by whether harvest units would occur on one or both sides of a channel. In terms of overall affected stream length, streams would be subjected to the greatest risk by Alternative 2, where 11.2 miles of stream would be within about 100 feet of a harvest unit. Following, in decreasing order, are Alternatives 1 (10.2 miles), 3 (8.8 miles), and 4 (8.2 miles).

Table 4-16. Length of Streams In or near Proposed Harvest Units (within about 100 feet)

Management Concern	Length of Streams Near Units (Miles)				
With harvest units on:	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Streambanks					
One side of stream	1.0	1.4	0.2	1.2	0
Both sides of stream	0.3	0.3	0.2	0.3	0
Subtotals:	1.3	1.7	0.4	1.5	0
Percentage*	3%	3%	1%	3%	0%
Side Slopes (including V-notches)					
One side of stream	3.3	4.4	3.6	2.4	0
Both sides of stream	5.6	5.1	4.8	4.8	0
Subtotals:	8.9	9.5	8.4	6.7	0
Percentage*	5%	5%	4%	3%	0%
Overall (stream banks plus side slopes)					
One side of stream	4.3	5.8	3.8	3.6	0
Both sides of stream	5.9	5.4	5.0	4.6	0
Totals:	10.2	11.2	8.8	8.2	0
Percentage*	4%	5%	4%	4%	0%

*Percentages below the subtotals and totals describe their part of the total lengths given in Chapter 3 for the two stream management concerns.

Roads and Stream Crossings

The transportation section of this chapter includes information regarding the type and length of roads to be constructed. Other factors being equal, the greater the total road length, the higher the risk of water quality degradation. Data from this section indicate that Alternative 2 would require the most new construction of roads (35 miles), followed in decreasing order by Alternative 3 (27 miles), Alternative 1 (26 miles), and Alternative 4 (24 miles). The fisheries section of this chapter describes riparian area road building and the crossings of mapped streams.

Cumulative Length of Affected Stream Channels

The cumulative effect of harvest units on streams includes the effect of stream lengths near proposed (Table 4-16) added to existing harvest units (Table 4-17). In terms of overall affected stream length, streams would be at greatest risk under the cumulative effects of alternative 2, where 20.9 miles of channel would be near or pass through units (Table 4-17). Following, in decreasing order of overall affected stream length, are Alternative 1 (19.9 miles), Alternative 3 (18.5 miles), and Alternative 4 (17.9 miles). Selection of Alternative 5, the "no action" alternative, would have the cumulative result of 9.6 miles of stream near units.

Table 4-17. Cumulative Length of Streams in or near Proposed and Existing Harvest Units (within about 100 feet)

Management Concern	Length of Streams Near Units (Miles)				
With harvest units on--	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Streambanks					
One side of stream	3.5	3.9	2.7	3.7	2.5
Both sides of stream	2.0	2.0	1.9	2.0	1.7
Subtotals:	5.5	5.9	4.6	5.7	4.2
Percentage*	11%	12%	9%	11%	8%
Side Slopes (including V-notches)					
One side of stream	4.8	5.9	5.1	3.9	1.5
Both sides of stream	9.6	9.1	8.8	8.3	4.0
Subtotals:	14.4	15.0	13.9	12.2	5.5
Percentage*	7%	8%	7%	6%	3%
Overall (stream banks plus side slopes)					
One side of stream	8.3	9.8	7.8	7.6	3.9
Both sides of stream	11.6	11.1	10.7	10.3	5.7
Totals:	19.9	20.9	18.5	17.9	9.6
Percentage*	8%	8%	8%	7%	4%

*Percentages below the subtotals and totals describe their part of the total lengths given in Chapter 3 for the two stream management concerns.

Cumulative Effects of Roads and Stream Crossings

Cumulative lengths of roads within watersheds include proposed new construction as well as previously constructed roads. The greatest cumulative length of roads would occur in Alternative 2 (58 miles), followed in decreasing order by Alternatives 3 and 1 (50 miles each), and Alternative 4 (47 miles) (refer to Table 4-21 in the transportation section). The "no action" alternative would maintain the existing total road length of 23 miles.

Cumulative Proportion of Area Harvested by Watershed Sensitivity

McCorison, et al. (1988) developed a model to determine relative sensitivities of watersheds in southeast Alaska. These sensitivities were used in conjunction with beneficial use indices to estimate watershed harvest thresholds of concern. Harvest near or over the threshold indicates increased risk of water quality degradation. Factors considered in this model include drainage densities, average channel stabilities of various channel types, erodibility of the various soils encountered, and an index of beneficial use values.

This model first assigns to each watershed one of four corresponding sensitivity classes. Maps 4-6 through 4-9 (opposite) illustrate the sensitivities of the individual watersheds and the proposed unit locations for each alternative. Then the model considers the beneficial uses of the various streams and the sensitivity of their respective watersheds before assigning a recommended maximum harvest area for each watershed. This percentage of the total watershed area is referred to as a watershed's threshold of concern (TOC).

When the model was applied to the analysis area, the results indicated most watersheds would contain cumulative harvest levels well below their threshold of concern. Typical of most watersheds in the analysis area are watersheds Q17A and Q20A. Thresholds of concern for these watersheds were estimated to be 50 and 20 percent of the watershed area for Q17A and Q20A, respectively (Figure 4-2).

Alternative 5 (the "no action" alternative), though proposing no new harvest units, still results in a cumulative 4 percent total harvest area in Q17A because of prior harvest; Q20A would remain unharvested. The four action alternatives in Q17A represent the sum of past (4 percent) and proposed harvests; thus, the figures represent the cumulative result of harvest unit area on the watershed.

For example, Alternative 1 proposes harvesting the greatest area at about 8 percent of the total watershed. With the 4 percent previously harvested, the cumulative affected harvest area is 12 percent of the watershed. This compares to the estimated threshold of concern of 50 percent.

Q20A sustains harvest only in Alternatives 1 and 2. In this case, cumulative affected area is equal to only the proposed harvest area. Alternative 1 would harvest 3 percent of the watershed area; Alternative 2 would harvest 6 percent. Both of these values are well below the estimated harvest threshold of 20 percent.

Only two watersheds were determined to contain harvest unit area in excess of their estimated thresholds of concern. Q19B, a third order sub-watershed north of Mosman Inlet, already exceeds its estimated threshold of 20 percent, currently at 27 percent (Figure 4-2). However, no harvest was scheduled in this sub-watershed in any alternative.

Q19C, also a third order sub-watershed northwest of Mosman Inlet, is the only watershed where harvest in an action alternative would exceed the threshold of concern, estimated at 10 percent. Due to harvest of units in prior timber sales, harvested area already exceeds the threshold at 15 percent (Figure 4-2). Alternative 4 is the only alternative to harvest additional acreage within this watershed--about 2 acres. At 369 acres, Q19C units will still have approximately 15 percent of its area in harvest units--5 percent over its estimated threshold.

Because these two are sub-watersheds of one large watershed, impacts will be mitigated to some extent due to the moderating effect of large watersheds. It should be noted that initial planning schemes scheduled harvests in Q19C in several alternatives, including a harvested area of 21 percent in Alternative 4. The interdisciplinary team process helped to mitigate this concern, minimizing harvest and reducing risk.

Alternative 1

This alternative would have visual impacts on Zimovia Strait, Anita Bay, the head of Burnett Inlet, the head of Mosman Inlet, and the eastern side of Mosman Inlet. Refer to Map 4-2.

In **Anita Bay**, nine units would be visible in the middleground viewing distance (units 101 thru 107, and 114 thru 116). The upper portion of unit 124 would be seen in the background. Within-stand modification, (internal exclusions and unit boundary modifications) would be incorporated into three units, (101, 114 and 115) as shown in the unit cards, in order to meet the inventory visual quality objective (VQO) of "modification."

One unit (101) would be viewed in the middleground from **Zimovia Strait**, and five units would be seen in the background (103 thru 107). Unit 101 has potential to be viewed from Nemo Point southward along Zimovia, but is likely to meet inventory VQO's with the incorporation of within-stand modification.

From the head of **Burnett Inlet**, six units would be seen in the middleground viewing distance (113, 114, and 108 thru 111). Within-stand modification would be incorporated into two units, (113, 109). Unit 114 was previously discussed with Anita Bay impacts. The combined effects of existing and proposed harvest around the head of this inlet are likely to result in a visual appearance of "maximum modification," while the inventory recommends "modification." Unit 113 has potential to cause the greatest visual impacts.

From **Mosman Inlet**, one unit (131) would be seen in the foreground and five units would be seen in the middleground (129, 132, 133, 135 and helicopter unit 142). Two units would be viewed in the background from the head of Mosman (117 and 124). Within-stand modification would be incorporated into two units (135 and 142). Unit 135 has potential for high visual impact due to its size, steep slopes and proximity to the inlet. The entire unit is likely to be seen, and may not meet the inventory VQO of "modification." Cumulative impacts of past and proposed harvest along Mosman would likely result in a visual appearance of borderline "modification/maximum modification."

From Stikine Strait, a portion of helicopter unit 139 may be visible for a short time in the background, but would likely be meet inventory VQO's.

Road impacts unique to this alternative: Sections of the road extending from unit 131 in Mosman Inlet to unit 135 would be seen from Mosman. A particularly difficult section between units 131 and 132 would likely result in exposed rock fill along perhaps a third of this distance.



Etolin Island Creek

Alternative 2

This alternative would have a visual impact on Anita Bay, the head of Burnett Inlet, the head of Mosman Inlet, the eastern side of Mosman, and Marble Point. Refer to Map 4-3.

In **Anita Bay**, 11 units would be visible in the middleground viewing distance (units 201 thru 207, 211, 212, 217 and 218). Four of these (203, 211, 212 and 217) would incorporate within-stand modification as shown on unit cards to meet the inventory VQO of "modification."

Two units (201 and 202) may be seen in the middleground from **Zimovia Strait**, and four would be seen in the background (204 thru 207). Inventory VQO's would likely be met by these units.

From the head of **Burnett Inlet**, three units would be seen in the middleground (208, 209 and 211). Small portions of unit 210 might be visible as well. Within-stand modification would be incorporated into two of these units (208 and 209); the third (211) was previously mentioned in the Anita Bay discussion. The combined visual effects of past and proposed harvest would likely meet a VQO of "modification". In **Mosman Inlet** and off **Marble Point**, nine of the eleven proposed units would be seen in the middleground viewing distance (units 234 thru 239, 231, 232, and helicopter unit 246). One unit (230) would be seen in the foreground. Unit 219 would be seen in the background from the head of Mosman Inlet; two existing units are visible in the same area. Within stand modification would be incorporated into four of these proposed units (238, 235, 234 and 246). The combined effects of past and present harvest would likely result in an appearance of borderline "modification/maximum modification", while the inventory recommends "modification". Unit 234 has potential for high visual impact due to its size, steep slopes and proximity to the inlet, and is not likely to meet inventory VQO's.

Road impacts unique to this alternative: Impacts of road construction would be similar to those described for Alternative 1. Roads south of unit 234 would likely be visible only where they cross a harvest unit.

Alternative 3

This alternative would have visual impacts on Anita Bay, Zimovia Strait, the head of Burnett Inlet and the head of Mosman Inlet. Refer to Map 4-4.

In **Anita Bay**, 11 units would be visible in the middleground viewing distance (units 301 thru 307, 311, 312, 318 and 319). The higher elevations of unit 327 would be seen in the background. Within-stand mitigation would be incorporated into six of these units (301, 302, 305, 311, 312 and 318) as shown on the unit cards, to meet an inventory VQO of "modification."

Portions of unit 301 would be seen in the middleground from **Zimovia Strait**, and three other units would be viewed in the background (305, 306 and 307). Unit 301 has potential to be viewed from Nemo Point southward along Zimovia, but would likely meet inventory VQO's.

In **Burnett Inlet**, portions of four units would be seen in the middleground (308 thru 311). Within-stand modification would be incorporated into three of these (309, 310 and 311). Combined impacts of past and proposed harvest would likely meet the inventory VQO of "modification" in the middleground.

In **Mosman Inlet**, helicopter unit 338 would be seen in the middleground and unit 331 would be seen in the foreground. Two units would be seen in the background (327 and 320). Within stand modification would be incorporated into unit 338 to meet a "modification" VQO.

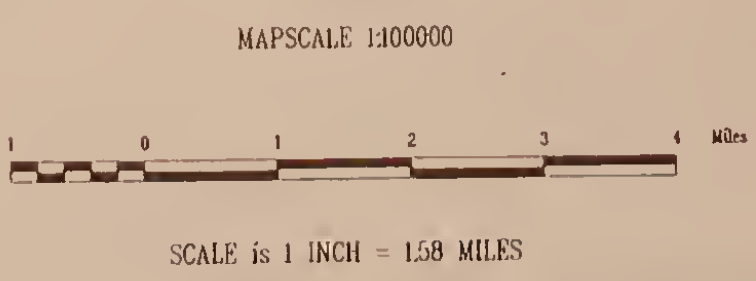
Road impacts unique to this alternative: No additional impacts.

Map 4-6. Alternative 1 Units in Watersheds



LEGEND

- | | |
|--------------------------|----------------------|
| Major Streams | Non-Dissected Slopes |
| Study Area Boundary | Low Sensitivity |
| Shoreline | Moderate Sensitivity |
| Proposed Group Selection | High Sensitivity |
| Proposed Clearcut | Extreme Sensitivity |
| Existing Clearcut | |



Map 4-7. Alternative 2 Units in Watersheds

32 ■ CHAPTER 4

STARFISH TIMBER SALE FEIS



LEGEND

- | | |
|--------------------------|----------------------|
| Major Streams | Non-Dissected Slopes |
| Study Area Boundary | Low Sensitivity |
| Shoreline | Moderate Sensitivity |
| Proposed Group Selection | High Sensitivity |
| Proposed Clearcut | Extreme Sensitivity |
| Existing Clearcut | |



SCALE is 1 INCH = 1.58 MILES



Map 4-8. Alternative 3 Units in Watersheds



LEGEND

- | | |
|--------------------------|----------------------|
| Major Streams | Non-Dissected Slopes |
| Study Area Boundary | Low Sensitivity |
| Shoreline | Moderate Sensitivity |
| Proposed Group Selection | High Sensitivity |
| Proposed Clearcut | Extreme Sensitivity |
| Existing Clearcut | |

MAPSCALE 1:400000



SCALE is 1 INCH = 1.58 MILES



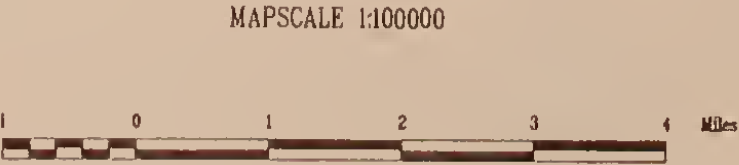
Map 4-9. Alternative 4 Units in Watersheds

40 ■ CHAPTER 4



LEGEND

- | | |
|--------------------------|----------------------|
| Major Streams | Non-Dissected Slopes |
| Study Area Boundary | Low Sensitivity |
| Shoreline | Moderate Sensitivity |
| Proposed Group Selection | High Sensitivity |
| Proposed Clearcut | Extreme Sensitivity |
| Existing Clearcut | |



SCALE is 1 INCH = 1.58 MILES



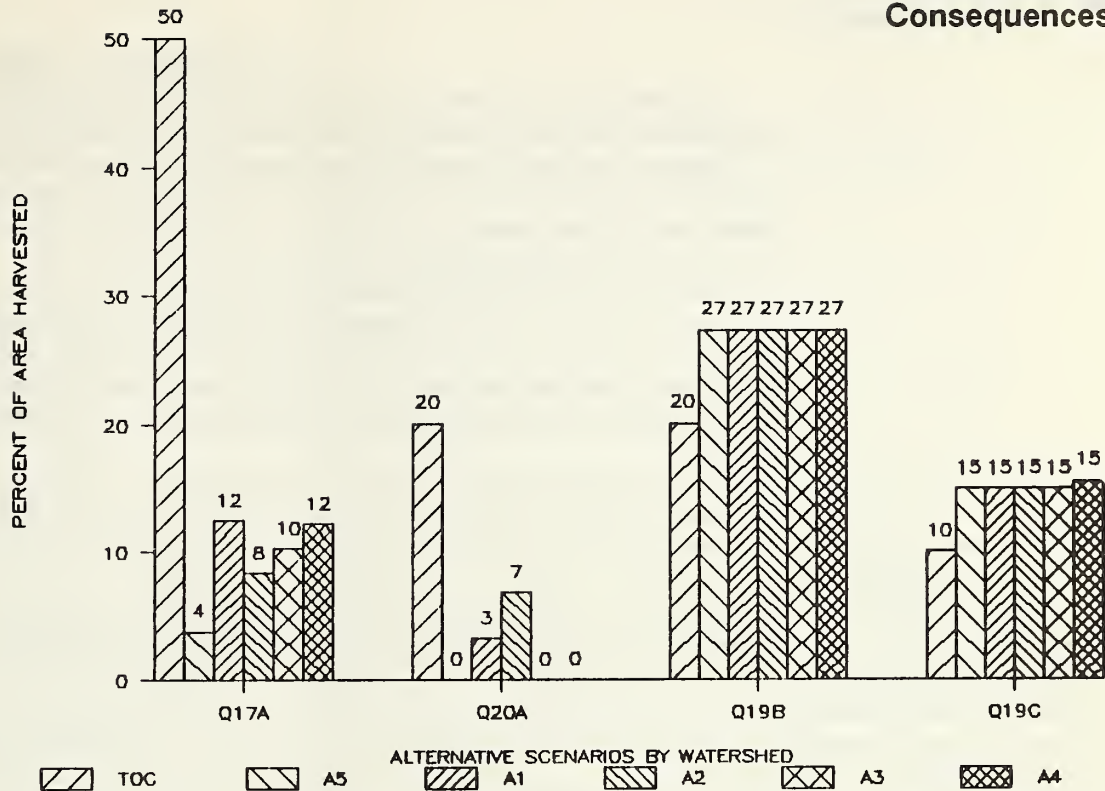


Figure 4-2. Cumulative Watershed Harvest Effects

Mitigation Measures

Aquatic habitat management unit (AHMU; see Chapter 3, Fisheries) guidelines will be followed and regional best management practices (BMP's) implemented. These measures will minimize the short term effects on runoff processes and sediment transport. Such measures include site specific use of vegetated streamside buffer strips, full or partial suspension of logs when yarding across streams, "splitlined" harvest settings (streambanks used as boundaries), and minimizing woody debris "loading" in stream channels. No noticeable long-term effects should occur as southeast Alaska watersheds tend to recover quickly due to the resilience of the forest vegetation.

Timber Economics

The purpose of a financial analysis is to provide a means of comparing the short-term costs and revenues for each alternative. In this analysis, the net value of each alternative was derived by subtracting all production costs, including an allowance for profit and risk, from end-product selling values.

Timber markets vary during the timespan between planning and actually selling a timber sale. It is not uncommon for timber values to change by as much as \$200 per thousand board feet during this period. Due to these market variations, the estimate of timber end-product selling value was based on a median or middle level of the timber market.

After the net value was derived, manufacturing costs were subtracted to determine "pond log value," or what the log is worth before processing. In addition, to test whether the sale would constitute an economic offering, an allowance for 60 percent of normal profit at the middle market level was included in determining the timber value. Woods production costs were then subtracted from this value in Table 4-18 to arrive at the total net value of each alternative. Table 4-18 also shows costs and values in dollars per thousand board feet to highlight differences between alternatives.

4 Environmental Consequences

Trial appraisals indicate that only alternative 2, due to its extensive road development, would be an uneconomic offering under these criteria.

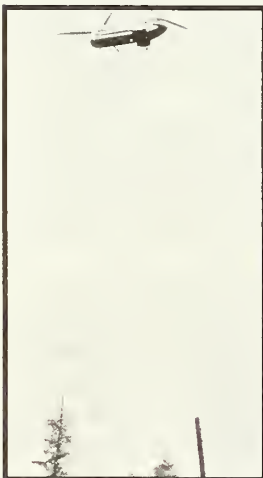
The volume class mix did not vary enough between alternatives to produce a significant difference in timber value per thousand board feet (MBF). For the the same reason, the stump-to-truck logging costs of the cable portion of each alternative are nearly the same.

For timber economics, the greatest real difference between alternatives is in the cost of road per thousand board feet harvested. This difference is mainly due to the varying volume of timber harvested per mile of road built in each alternative. Alternative 4 has a higher spur road cost because more of the volume is located along existing roads, where only short spurs are needed, rather than new specified road.

Table 4-18. Timber Values and Costs to an Operator of Average Efficiency

ECONOMIC FACTOR	Alt. 1	Alt. 2	Alt. 3	Alt. 4
VOLUME (w/utility)	55,400	60,700	51,700	52,600
SELLING VALUE (\$MBF)	321	320	321	322
COSTS (\$/MBF)				
Stump to Truck	150	149	151	150
Transportation	30	35	30	30
General Logging Overhead	5	5	5	5
Erosion Control	1	1	1	1
Temporary Development	6	7	7	9
Specified Road Cost	68	84	75	60
Logging Profit and Risk	47	46	47	48
NET STUMPAGE (\$MBF)	14	-7	5	19

Actual trial appraisal summaries are included in Appendix F. However, it must be remembered that these values and costs will differ from the final appraised rates. They are used here to provide an economic basis for comparing between alternatives and other timber sales.



Helicopter Logging



Mosman Inlet

Employment

The number and value of jobs provided by the harvesting and processing of timber on the Starfish analysis area is based on the following assumptions:

1. Seven jobs are generated per million board feet of timber harvest.
2. The value of each job is \$33,300 per year.
3. The secondary benefit of dollar return to communities is a seven-to-one ratio of the direct job value.

Alternative 2 would generate the most jobs, followed by Alternatives 1 and 4 (see Table 4-20). Alternative 3 would generate the fewest jobs.

Table 4-19. Number and Value of Jobs Generated by a Starfish Analysis Area Timber Sale

Factor	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Number Jobs Generated	329	364	308	315	0
Dollar Value (million \$)	11.0	12.1	10.3	10.5	0
Secondary Dollar Value (million \$)	77.0	84.7	72.1	73.5	0



Looking Down Burnett Inlet

4 Environmental Consequences

Cumulative Effects

Selection of one of the action alternatives would contribute to the continued viability of the timber industry in southeast Alaska and the continued socio-economic stability of southeast Alaska communities. Selection of the "no action" alternative would not contribute to job or community stability.

Transportation

Forest roads in the Starfish analysis area are classified as either specified or spur roads. The differences are related to the length of service life and the need for control of the road construction process.

Specified Roads

All proposed specified roads would be developed and operated for long term land management. As a part of the forest development road system, specified roads serve as the primary transportation link in the sale area. They provide access to each of the harvest units and link the units to the log transfer facility. Following the timber sale described in this Draft EIS, specified roads would also be used in future timber harvest entries, for recreation access, and for ongoing silviculture activities such as stocking surveys and precommercial thinning. Their location and design is specified by the Forest Service.

Spur Roads

Spur roads are road segments that run from the specified road into the harvest units and the sort yard. Following the initial entry, water bars will be installed on spur roads and spur roads will be allowed to grow back, most likely to alder. Feasible spur locations are suggested by the Forest Service but the contractor may choose alternative routes subject to Forest Service approval. Approval is dependent on a location consistent with the same or less impact than the selected alternative.

Cumulative Effects

The impacts of road construction on the Starfish timber sale area are related to the following factors:

The length and location of roads

Specified roads, while providing access, remove some land from timber production and wildlife habitat. In addition, some erosion can be expected as a result of the construction, operation, and maintenance of the roads. (See Fisheries section for discussion of consequences.)

All soil exposed during construction will be grass seeded, and within a few years will not contribute significantly as a sediment source. Spur roads will be closed by removing culverts, installing water bars and allowing alder to grow over the roadbeds. Since the cut banks of these roads are seeded and the roadbeds themselves allowed to revegetate, spurs should not provide a source of sediment until they are used again to harvest the second-growth in around 100 years. (See Table 4-21, page 4-36, for mileage differences between alternatives.)

The number of stream crossings and the amount of road constructed near streams

The construction of culverts and bridges may cause some erosion of sediment into the creeks when and where construction takes place. This will be a short-term impact.

Number and location of rock pits required for construction materials

Rock pits, like roads, remove lands from timber production and are a long term impact.

Location of log transfer facility (LTF)

The existing facility at Starfish Cove will be used for this timber sale. Log bundles will also be rafted and stored in Starfish Cove.

Whether not the road system connects with any other road system

For the life of this sale, the roads in this analysis area will not be connected to any other road system; private passenger vehicle use on these roads is not anticipated.

However, a portion of the remaining length of Road 6272 connecting to the Olive Cove road system would be constructed in each of the action alternatives, increasing the likelihood of an eventual connection. If and when road 6272 along Anita Bay is connected to the Olive Cove portion of Road 6272, more recreation use of the road system in this analysis area can be expected, especially from the residents around Olive Cove. Conversely, the perception of isolation currently sought by many residents around Olive Cove would be diminished. Table 4-21 lists the miles of Road 6272 remaining to be built to connect the two systems after this sale.

Every effort has been made to locate roads to avoid slope stability problems, provide stable low-impact stream and drainage crossings, and minimize construction and haul costs. In addition, it is recognized that altering the landscape, depending on the nature of bedrock, may create contrasting soil color. This may be noticeable on roads constructed on the mid-slope of steep ground. The road with the most likelihood of being seen on this sale is Road 6272 along Anita Bay. The bedrock along most of this location is granitic, which will initially be very white when exposed. Every effort has been made to locate this road on natural benches and along the tops or bottoms of cutting units which will minimize the visual impact from the bay. When this was not possible we have tried to leave trees below the road to provide a visual screen.



Tower and Loader in a Cable Yarding System

4 Environmental Consequences

Table 4-20. Some Consequences of the Transportation System.

	Unit	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Specified Road Construction	Miles	24	32	25	21	0
Spur Road Construction	Miles	2	3	2	4	0
Estimated Number of Rock Pits ¹	Units	15	20	16	14	0
Estimated Quantity of Road Rock ²	Thousand Cubic Yards	305	415	329	301	0
Distance From Connecting Road System to Olive Cove	Miles	2.0	0.2	0.9	0.9	5.8
Estimated Land Converted From Natural State by Road and Rockpit Construction ³						
Roads	Acres	149	198	155	130	0
Rock Pits	Acres	8	10	8	7	0
Total	Acres	154	211	163	144	0

¹ Based on 1 rock pit every 1.75 miles of total road system.

² Based on total road system using estimates which vary by terrain type.

³ Based on an average of 6.2 acres per mile for specified roads and an average rock pit size of .5 acre.

Energy Requirements

The amount of energy needed to implement the harvest of timber on each alternative is based on the following assumptions:

1. The rate for timber sale preparation and administration is 0.5 gallon per thousand board feet.
2. The rate for high-lead logging is 2 gallons per thousand board feet.
3. The rate for loading and hauling by truck and for water transport is 8 gallons per thousand board feet.
4. The rate for road construction is 4,000 gallons per mile.
5. The rate for road maintenance is 20 gallons per mile.
6. For the helicopter units, a Bell 214B helicopter would use 160 gallons per hour and would yard 20,000 board feet per hour (8 gallons per thousand board feet).

Table 4-22 shows the energy used for each action alternative:

Table 4-21. Estimated Fuel Consumption by Alternative on the Starfish Timber Sale

Fuel Consumption	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Thousands of gallons	0	645	736	619	621
Average gallons/MBF	0	13.7	14.2	14.1	13.8

Chapter 5

List of Preparers

List of Preparers

Members of the interdisciplinary team (IDT) responsible for conducting the Starfish Timber Sale analysis and preparing the environmental impact statement are listed alphabetically below:

Robert Alken Transportation Planner	B.S. Forest Engineering 11 years experience
Michael Crane Certified Silviculturist Core Team Member	B.S. Forest Management 6 years experience
Charlotte Greenfield GIS Programmer/Analyst	B.S. Psychology 13 years experience
Elbert Hardin Archaeologist	B.A. Anthropology 5 years experience
Susan Hardin Writer/Editor	B.A. English 7 years experience in English education
Chris Iverson Wildlife Biologist	B.S. Biology, M.S. Wildlife Ecology 9 years experience
Carol Jensen Landscape Architect	B.S. Landscape Architecture 6 years experience
Merrily Jones Public Affairs Specialist	B.A. English 14 years experience
Everett Klssinger Soil Scientist	B.S. Agriculture 24 years experience
Keene Kohrt Wrangell District Ranger Team Leader	B.S. Forestry 32 years experience
Mark McCallum Archaeologist	B.A. Anthropology 13 years experience
Margaret Mitchell Landscape Architect	B.S. Landscape Architecture M.S. Forest Management 4 years experience
Kathleen Mohar Wildlife Biologist Core Team Member	B.S. Wildlife Biology 4 years experience

5 Preparers

David Rak Recreation Forester	B.S. Resource Management (Forestry), M.S. Forest Soils 13 years experience
Dennis Reed Fisheries Biologist Core Team Member	B.S. Biology, B.S. Forestry 19 years experience
Patricia Rodgers GIS Technician	13 years experience
James Schramek GIS Coordinator	B.S. Forest Resources, M.S. Forest Hydrology 15 years experience
John Stevens Silviculturist	B.S. Forestry 14 years experience
Richard Strauss Planning Forester Project Team Leader	B.S. Forest Resource Management 15 years experience
Susan Varner GIS Technician	5 years experience
Andrew Willson GIS Programmer/Analyst	B.S. Forestry, M.S. Forest Economics 10 years experience
Susan Wise Wildlife biologist	B.S. Zoology 13 years experience
Michael Wolanek Hydrologist	B.S. Forest Management, M.S. Forest Hydrology 3 years experience

Chapter 6

List of Agencies, Organizations, and Persons to Whom Copies of this EIS were Sent

List of Agencies, Organizations and Persons to Whom Copies of This Statement Were Sent

The following organizations and individuals are on the mailing list to receive the Final EIS. Number of copies sent are in parentheses.

Agencies

Alaska Department of Fish and Game, Petersburg (1)
Alaska Division of Governmental Coordination, Juneau (5)
U.S. Environmental Protection Agency, Seattle (5)
Federal Agency Liaison Division, Washington, D.C. (5)
U.S. Dept. of Commerce, NOAA, Ecology & Conservation Div., Washington D.C. (1)
U.S. Dept. of Commerce, NOAA, Nat. Marine Fisheries Service, Juneau (1)
U.S. Department of Interior, Washington D.C. (18)
U.S. Fish and Wildlife Service, Juneau (1)
U.S. Army Corps of Engineers, Anchorage (1)
U.S. Forest Service, Ketchikan Area (1)
U.S. Forest Service, Washington D.C. (5)
U.S. Forest Service, Petersburg R.D. (5)
U.S. Forest Service, Wrangell R.D. (20)
U.S. Forest Service, Chatham Area (1)

Organizations

Alascom, Inc., Anchorage (1)
Thoms Place Homeowners Association (1)
Wrangell Chamber of Commerce (1)
Olive Cove Homeowners Association (1)
Southeast Alaska Conservation Council (1)
Alaska Pulp Corporation, Sitka (1)
Ketchikan Pulp Company, Ketchikan (1)
Wrangell Fish and Game Advisory Committee (1)
Sealaska Corporation, Juneau (1)
Southeast Alaska Conservation Council (1)
Southern SE Regional Aquaculture, Ketchikan (1)
Aquaculture Incorporated, Wrangell (1)
American Wilderness Alliance (1)
Heritage North, Seattle (1)
Ketchikan Sports and Wildlife Club (1)
Meyers Chuck Community Association (1)
Mitkof Lumber Co., Inc., Petersburg (1)
Narrows Conservation Coalition (1)
National Audubon Society, Juneau (1)
Petersburg Vessel Owners (1)
Puget Sound Log Scaling & Grading Bureau, Thorne Bay (1)

6 List of Agencies, Organizations and Persons

Rocky Mountain Elk Foundation, Ketchikan (1)
S.A.V.E. Inc. (1)
Sierra Club, Juneau (1)
Sierra Club, Sitka (1)
Sierra Club Legal Defense Fund, Inc. (1)
Stikine Gillnetters Association (1)
Tongass Conservation Society, Ketchikan (1)
United Southeast Gillnetters (1)
Whale Pass Homeowners Association (1)
Whale Pass Residents Association (1)
Wrangell Sentinel (1)
Wilderness Society (1)

Individuals

Keith Appleman (1)
Johe Augustine (1)
Ralph A. Bache (1)
Rick & Patsy Barton (1)
Holly Bashelier (1)
Brian Castle (1)
Charlotte Cawthorne (1)
John Church (1)
Art Clark (1)
Marlene Clark (1)
Dr. Wayne Davenport (1)
Jamie DeBoer (1)
Wayne & Chris Ellis (1)
John & Janice Emde (1)
Tom Gillen (1)
Lanny Hamely (1)
Joel & Alice Hanson (1)
Dean Harris (1)
Frank and Vivian Grossardt (1)
Jacquelyne Hunley (1)
Barb and Mike Rugo (1)
Honorable Lloyd Jones (1)
Honorable Robin Taylor (1)
Honorable Cheri Davis (1)
Steve & Virginia Helgeson (1)

Ann & Guy Hoppen (1)
Tom Ingel (1)
J.B. Jacks (1)
Jenny Jones (1)
Ray Lawton (1)
Bill Messmer (1)
Randy Martin (1)
Bill McMurren (1)
Bruce & Nancy McQueen (1)
Clayton H. Mock (1)
Don R. Nicholson (1)
Al Ogeland (1)
Bill Privett (1)
Donna Rice (1)
Bob Richardson (1)
Bill & Heather Rosborough (1)
Tony & Debbie Schmid (1)
August & Loretta Schultz (1)
Jim Spignesi (1)
Stephen Stocks (1)
Patrick Taylor (1)
Charles P. Van Epps (1)
Eugene Wells (1)
Kurt Welser (1)
Mr. Peter Branson (1)

Chapter 7

Glossary

Glossary

Alevins

The newly hatched salmon when still attached to the yolk sac.

Alaska National Interest Lands Conservation Act (ANILCA)

Passed by Congress in 1980, this legislation designated 14 national wilderness areas in southeast Alaska.

Anadromous

Refers to those fish, usually salmonids, that spawn (some also rear) in freshwater and mature in saltwater.

Aquatic Habitat Management Unit (AHMU)

An area of stream and associated streamside habitat having fish values of such importance that land use activities will be prescribed to meet the management goals for fish habitat.

Buffer Zone

An area surrounding a special feature in order to protect it from development.
eagle nest trees: 330 foot radius around eagle nest trees
cultural sites: as needed

Carrying Capacity

The number of animals that an area can maintain in a healthy condition.

Commercial Forest Land (CFL)

Commercial forest land is land that can produce at least 8,000 board feet of timber per acre in one hundred years.

Cultural Resource

Any evidence of mankind's activities and behavior; includes data from archeology, architecture, ethnology, and history.

Dispersed Recreation

Outdoor recreation use occurring outside a developed recreation site; includes such activities as scenic driving, hunting, backpacking, and boating.

Distance Zones

Landscape areas denoted by specific distances from the observer, and characterized by the level of detail apparent in the subject.

Foreground: The detailed landscape within 0 to 1/4-1/2 mile of the viewer. Individual leaves and branches provide coarse texture.

Middleground: The area located within 1/2 to 3-5 miles of the viewer. Individual trees and tree groupings provide texture and form.

Background: The area within 3-5 miles to infinity of the viewer. Texture becomes indiscernible; shapes and washes of color become more dominant than texture.

Escapement Counts

When fish return to small streams to spawn, some are captured by fishermen. Those that escape being caught make up the escapement count.

Estuary

For purpose of this EIS process, estuary refers to the relatively flat, intertidal, and immediate upland areas, generally found at the heads of bays and mouths of streams. They are predominantly mud and grass flats and unforested except for scattered spruce or cottonwood.

Floodplain

The lowland and relatively flat areas joining inland and coastal waters, including debris cones and flood-prone areas of offshore islands, including, at a minimum, that area subject to a 1 percent (100-year recurrence) or greater chance of flooding in any given area.

High Grading

Taking the greatest volume per acre.

Inoperable Timber

Timber which is not practical to harvest because of potential resource damages, economic infeasibility, physical limitations or inaccessibility.

Internal Exclusion

A group of trees in a unit that will be left standing.

Interdisciplinary Team (IDT)

A group of individuals representing different areas of knowledge and skills focusing on the same task, problem, or subject.

Irretrievable Commitment

The production or use of renewable resources that is lost because of allocation decisions. It represents opportunities foregone for the period of time that the resource cannot be used.

Irreversible Commitment

Commitment of resources that are renewable only over a long period of time, such as soil productivity, or to nonrenewable resources, such as cultural resources or minerals.

Land Use Designation (LUD)

The method of classifying land use by the Tongass Land Management Plan. Land uses and activities are grouped together with a set of coordinating policies, an essentially compatible combination of management activities. A brief description of the four classifications follows:

LUD I: Wilderness areas.

LUD II: These lands are to be managed in a roadless state to retain their wildland character, but this designation would permit wildlife and fish habitat improvement, utility corridors, and primitive recreation facility development and roads under special authorization.

LUD III: These lands are to be managed for a variety of uses. The emphasis is on managing for uses and activities in a compatible and complimentary manner to provide the greatest combination of benefits.

LUD IV: These lands will provide opportunities for intensive resource use and development. Emphasis is primarily on commodity or market resources.

Log Transfer Facility (LTF)

A facility located where the road network terminates at saltwater. May be used for a number of transportation purposes. For timber harvesting, the log transfer facility is where logs are bundled and placed into rafts on the water for towing to local mills.

Management Indicator Species

Indicator species that would represent habitat requirements for an assortment of other wildlife species.

Mass Failures or Mass Movement

The downslope movement of a block or mass of soil. This usually occurs under conditions of high soil moisture, and does not include individual soil particles displaced as surface erosion.

MBF and MMBF

Thousand board feet and million board feet, respectively.

Mid-Market

Mid-market timber is timber which a mid-market assessment described herein indicates would provide a weighted average margin for profit and risk of at least 60% of normal. The mid-market assessment to mid-market timber shall be based on mid-market weighted average pond log value, estimated logging and road costs, normal profit ratios, and base rates developed using standard Forest Service appraisal methods and data in effect on the date the Forest Service initiates the NEPA process (Notice of Intent is published in the Federal Register).

Pond Log Value- Mid-market average pond log value shall be determined as follows: 1) Appraisal data to develop a mid-market pond log value shall be determined for each species, and shall be the standard Forest Service appraisal data in effect in the quarter in which the pond log value (end-product selling price less manufacturing cost) for the species and product mix most closely matches the point between the ranked quarters of the Alaska Index Operations pond log value, adjusted to Common Year Dollars, where one-half of the timber from the Tongass National Forest has been removed at higher values and one-half of the timber from the Tongass National Forest has been removed at lower values during the period from the first quarter of 1979 to the quarter current on the NEPA start date. When more than one quarter would qualify, the most recent shall be used. 2) Mid-market weighted average pond log value shall be calculated by volume class, adjusted to Common Year Dollars, using appraisal data determined for each species.

Common Year Dollars- are dollars adjusted to the NEPA start date, using the relevant indices in the Producer Price Index for all commodities published by the USDL Bureau of Labor Statistics.

Mining

Includes all operations (prospecting, exploration, development) for the extraction of mineral resources--underground, placer, and open pit mines; rock, and sand and gravel borrow, etc.

Mitigation

Action or actions taken to avoid or minimize negative impacts of a management activity. Includes avoiding an impact altogether by not taking a certain action or part of an action; minimizing an impact by limiting the degree or magnitude of an action and its implementation; rectifying the impact by repairing, rehabilitating, or restoring the affected

environment; reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; or compensating for the impact by replacing or providing substitute resources or environments.

Monitoring

Following a course of events to determine what changes occur as the result of an action.

NEPA

National Environmental Policy Act of 1969.

New Perspective

New Perspective is the pathway for implementing certain of the new directions in the 1990 RPA Program (the Forest Service's 5-year strategic program for carrying out its mission under federal laws and regulations) and new Forest and Research plans. These plans and programs call for their full array of values and benefits, with increased emphasis on fisheries, wildlife, recreation, ecological sustainability, and long-term productivity. The two main goals of New Perspectives are; 1) to demonstrate the new directions for socially responsive and scientifically sound management of lands and resources to meet people's needs for forest and rangeland products while protecting natural and cultural resources for long-term health of the land and quality of life, 2) to develop the new scientific knowledge and technologies needed to better manage forest and rangeland ecosystems.

NFMA

National Forest Management Act of 1976.

Non-Commercial Forest Lands

Lands with more than 10 percent cover of commercial tree species but not qualifying as Commercial Forest Land.

Operable Commercial Forest Land

Timber suitable for harvest with the capability of being harvested and transported to market.

Normal harvest operability - Timber which can be harvested with standard equipment and predominant techniques now in use. These are highlead, A-frame, skyline less than 2,600 feet, and tractor.

Non-Standard harvest operability - Timber which cannot be harvested with standard equipment and techniques but would require other systems including balloon or helicopter and skyline over 2,600 feet.

Primary Protection

Primary Protection of Primary Streamcourses is a timber sale contract provision requiring the protection of designated "Primary" streams. This involves developing an Operating Plan (including timing and guyline circle trees) for falling timber within a 200-foot streamside strip, directional felling away from streamcourses, immediate yarding of any trees entering streamcourses, leaving designated felled or windthrown trees that have entered streamcourses, and full suspension yarding across such streamcourses. "Primary" streamcourses are usually fish streams or other streams requiring a high degree of water quality protection.

Profit & Risk

That portion of the appraisal allocated to industry profit, interest on borrowed capital, risk, and income taxes.

Profit & Risk Margin

The monetary estimate of Profit & Risk

Riparian Areas

Land and vegetation for approximately 100 feet from the edges of all perennial streams, lakes, and other bodies of water. This area shall correspond to at least the recognizable area dominated by the riparian vegetation.

Riparian Ecosystem

A transition between the aquatic ecosystem and the adjacent terrestrial ecosystem; identified by hydric soil characteristics or distinctive hydrophytic vegetation communities that require free or unbound water.

Recreation Opportunity

The availability of real choice for recreationists to participate in a preferred activity within a preferred setting, in order to realize those satisfying recreation experiences which are desired. Recreation opportunities are often described in terms of six classes of opportunity:

Primitive: The most remote, undeveloped, and inaccessible opportunities. Generally includes areas out of sight and sound of human activities and greater than three miles from roads or waterways open to public travel.

Semi-Primitive, Non-Motorized: Limited opportunities for isolation from the sights and sounds of humans, and a high degree of teneration with the natural environment. Generally includes those areas greater than 1/2 mile and less than three miles from waterways, with roads and trails open to motorized use.

Semi-Primitive, Motorized: Predominantly unmodified natural environment with minimum evidence of sights and sounds of humans with primitive roads and trails open to motorized use. Generally includes areas less than 1/2 mile from waterways. Roads are not maintained.

Roaded, Natural: Predominantly natural environments with moderate evidence of sights and sounds of humans. Includes areas less than 1/2 mile from roads open to public travel, railroads, waterways, major powerlines and within resource modification areas.

Rural: Includes those areas within small communities, developed campgrounds, developed ski areas, and administrative sites. Modifications are primarily to enhance specific recreation activities. Sights and sounds of humans are readily evident.

Modern-Urban: Substantially urbanized environments, although the background may have elements of a natural environment. Renewable resource modifications and utilization practices are common. Vegetative cover is often exotic and manicured. Sights and sounds of humans are predominant.

Resident Fish

Fish which are not anadromous and which reside in fresh water on a permanent basis. Resident fish include non-anadromous Dolly Varden char and cutthroat and rainbow trout.

Riffles

Shallow water, flowing over gravel, where salmon and trout commonly spawn.

Riparian Ecosystems

Includes wetlands, streams and lakes, and those areas around streams and lakes which can influence the aquatic environment.

Rock Weathering Agent

A compound that is sprayed on rocks to speed natural weathering by accelerating the oxidation process. Harmless to plants and wildlife, it is used to make disturbed land blend in with the natural landscape.

Rotation

The planned number of years between the formation of regeneration of a stand and its final cutting at a specified stage of maturity.

Secondary Protection

Secondary Protection or Protection of Secondary Streamcourses is a timber sale contract provision requiring the protection of designated "Secondary" streams. This involves removing timber felled across such streams within same operating season, and removing logging slash from the streamcourse before the yarder leaves the harvest unit or upon completion of seasonal logging activities, whichever comes first. "Secondary" streamcourses are those which do not possess fish habitat but could affect habitat downstream.

Sedimentation

Addition of fine organic or inorganic material to a stream channel. Usually that portion remaining in the streambed gravel.

Sensitivity Levels

A measure of viewer interest in scenic quality of the landscape as seen from roads, trails, waterways or other travel routes and from facilities or other areas of the national forest that have significant public use. Level 1 has the highest sensitivity, level 3, the lowest.

Setting

The setting identifies the timber stands that are tributary to a landing by use of a given timber harvest system.

SHPO

State Historic Preservation Officer

Soil Hazard Classes

Mass-wasting as used here is restricted to relatively shallow translational failures of the soil mass, and specifically excludes deep rotational failures and debris failures within stream channels. While slope gradient is the primary site factor determining the stability of natural slopes, soil and geologic properties, such as cohesion, moisture regime and the presence of a prominent slip-plane are used to determine relative stability of soil/landtype units. The relative ranking is based on state-of-the-art research,

laboratory data on soil properties, as well as our collective experience in the management of similar soil/landtype areas on the Tongass N.F.

High: The soil/landtype units in this class are the least stable, and have the greatest probability of slope failure. These units generally have slope gradients that exceed the natural angle of stability. It includes most well drained soils on slopes of 75 percent or greater, as well as some soils with restricted drainage (somewhat poorly and poorly drained soils) on slopes in excess of 65 percent. Most natural occurring landslides initiate in units of this class. They often, but not always, have visible indications of instability or past failures, such as slide scarps, tension cracks, jack-strawed trees, mixed pedogenic horizons etc.

The risk of management induced slope failures is so high on these areas that they are generally precluded from normal forest harvest and roading activities. Where management activities can not be avoided on these areas, site specific investigations are necessary to determine on a case-by-case basis; (1) the probability of failure based on a site-specific stability analysis; and (2) the likely effect of a failure on associated resources such as water quality, fish habitat, etc. Forest roads can sometimes be built on these areas by locating them on included areas of less sloping benches, or by the application of unusual, and often prohibitively expensive, mitigative measures such as retaining walls, buttresses, bulkheads or other external support systems.

Moderate: The soil/landtype units in this class are generally stable in an undisturbed condition, however, any natural disturbance or management practice that adversely changes the complex soil strength-stress relationship can result in slope failures. These areas rarely have visible indications of instability.

Soil/landtypes in this class can be safely managed without a high risk of landslides by application of management practices designed to maintain the shear strength of soil and roots, and avoid increasing the effective weight of the soil mass. Management practices should be designed to avoid interrupting the natural surface and subsurface drainage patterns and minimize disturbance to the soil surface.

Low: Soil/landtype units in this class have the least probability of landslides. Any slope failures that do occur are usually associated with included incised stream channels (V-notches), or short steep escarpments. This class includes most soils with slope gradients less than 35 percent.

These areas are normally not subject to mass wasting, however management practices designed to protect streambanks and v-notches, and prevent surface erosion are appropriate.

Temperature-Sensitive Stream

Those streams flowing out of lakes or muskegs, or for some other reason susceptible to warming beyond a tolerable level for fish.

Threshold of Concern

The relative level of sensitivity of a watershed. Tree harvest near or over the threshold indicates increased risk of water quality degradation. Factors considered when determining this include drainage densities, average stabilities of various channel types, erodibility of the various soils encountered, and an index of beneficial use values.

Unit

A term from the Timber Sale Contract. This term is used to describe the smallest identifiable portion of land included in a timber sale for timber harvest. Each Unit consists of one or more settings and associated landings. All the settings included in

a Unit are planned for timber harvest using the same yarding method and are in proximity to each other.

VCU - Value Comparison Unit

A distinct geographic area that generally encompasses a drainage basin containing one or more large stream systems. Boundaries usually follow easily recognizable watershed divides. These units were established to provide a common set of areas for which resource inventories could be conducted and resource values interpretations made.

Visual Absorption Capability (VAC)

A measure of the relative ability of the landscape (high, intermediate or low) to absorb visual change. Ratings are based on landform complexity, slope, viewer aspect/angle and vegetative screening. High VAC is characterized by low rolling topography or unseen slopes where management activities are not likely to be seen. Low VAC is characterized by steep, highly visible hillsides with a uniform cover of vegetation.

Visual Management Classes (VMC's)

A product of the combination of VQO's and VAC's, Visual Management Classes indicate the management objective and the relative effort required to meet that objective. VMCs 1 and 2 indicate areas of high scenic value or landscapes with steep, highly visible slopes. Special attention to project design would be necessary to meet VQOs. VMCs 3 and 4 indicate areas that are generally not seen or that have low, rolling topography, and VQOs would be relatively easy to meet.

Visual Quality Objectives (VQO's)

VQOs are standards for visual quality which reflect the varying degrees to which the landscape may be modified. The standards are based upon viewing distance, the character of the natural landscape, and the public's concern for scenic quality. "Inventory" VQO's have not yet undergone trade-off analysis relative to other resources. "Adopted" VQO's reflect analysis involving other resources and become management direction in a selected and approved land management alternative. The five visual quality management objectives follow:

Preservation - Allows only ecological changes. Management activities, except for very low visual impact recreation facilities, are prohibited.

Retention - Provides for management activities which are not visually evident. Management activities are permitted but the results of those activities on the natural landscape must not be evident to the average viewer.

Partial Retention - Management activities may be evident to the viewer, but must remain visually subordinate to the surrounding landscapes.

Modification - Management activities may visually dominate the original surrounding landscape but must borrow from naturally established form, line, color, and texture.

Maximum Modification - Land management activities can dominate the natural landscape to a greater extent than in the modification objective except as viewed from background when visual characteristics must be those of natural occurrences within the surrounding area.

Wetlands

Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

Winter Range

Areas used by animals from December through March, when many sources of food are covered with snow. For deer, winter range is generally found below 1200 feet elevation on north-facing slopes and below 1500 feet elevation on all other slopes. During severe winters, the greatest number of deer can be supported by high-volume, old-growth stands on south-facing slopes, below 500 feet elevation and within 1/4 mile of salt water.

Chapter 8

Index

Index

Alaska Department of Environmental Conservation	1-7
Alaska Department of Fish and Game	1-6; 3-2,3,6,38; 4-5
Alaska Department of Natural Resources	1-7
Alternative formulation	1-2,5,6; 2-1
Alternatives not considered in detail	2-4
Alternatives considered in detail	2-4
Anchorage	3-35,24,27
Bald eagles	1-6; 2-21,22,25; 3-2,3,7,12; 4-2,3,8
Black bear	1-6; 2-7,21; 3-2,3,6,7; 4-2,3,6,7,8,9,13,14,15
Bridges and culverts	4-44
Commercial fisheries	3-15,19,22
Commercial forest land	1-1; 2-1,2,3,8,9,13,14,15,19,20; 3-8,46,49,51; 4-5,15,28
Coho fish	2-26; 3-15,18,21
Cultural resources	1-2; 2-25; 3-30; 4-20,21,22
Decision	1-2,7; 3-35
Department of the Army, Corps of Engineers	1-7
Economics	1-5; 2-3,4,5,13; 4-1,41,42
Employment	2-21; 3-52; 4-33
Endangered/threatened species	1-7; 3-3
Environmental consequences	1-1,2; 2-19
Environmental Protection Agency	1-7
Federal and State permits and licenses	1-7
Fish	1-2,6; 2-1,2,4,5,9,10, 13,14,15,16,20,21,26; 3-6,18,19,20,21,22,29,30,41
Interdisciplinary Team	1-5; 2-1,3,4,25; 4-36
Impacts on:	
cultural resources	4-20,21,22
fisheries	2-13,21,24; 4-16,17,18,33,44,45
recreation	4-22
soil	4-31
subsistence	2-21; 4-2,9,19
timber	4-1,2
visual resources	2-2,6,8,14,15,25,28; 4-22,23,24,27,28,45
wildlife	2-6,22; 4-2,3,4,5,6,7,8,32

Irreversible and irretrievable commitment of resources . . .	4-2
Issues	1-3,4; 2-4,27
Land Use Designation	1-1,2; 2-2; 3-1,8; 4-13
List of preparers	5
Log transfer facility	1-3,5; 2-5,9,10,13, 14,17; 3-36,52; 4-44,45
Mailing list	6
Management Indicator Species (MIS)	1-6; 2-7; 3-3; 4-4,14
Marten	1-6; 2-7,21; 3-2,3,6,7,11; 4-2,3,7
Miles of road construction	2-1,8,13,14,15,16,19,20 3-22; 4-17,18, 19,20,31,32,33,34,35,45,46
Minerals	3-29
Monitoring	2-26,27,28
National Forest Management Act (NFMA)	2-14; 4-4
New Perspectives.	3-5,6
Opportunities	1-6; 2-4,5,6; 3-21; 4-2,19,28
Old-growth timber	2-2,5,6; 3-8,49,50; 4-1,2,3,4,8,10,11,13,19
Otter	1-6; 2-7,21; 3-3,6,7; 4-2,3,6
Over-size timber units	2-22
Preferred alternative	2-15,25,27; 4-9,13,42
Process used to formulate alternatives	1-2; 2-1
Public involvement	1-5; 2-4,7; 3-1
Rearing habitat	2-25,26; 3-21,42
Recreation	1-2; 2-5,26; 3-20,23,24,27,35,52; 4-19,20,22,44,45
Road construction	1-5,6; 2-1,2,4,5,6,8 13,14,15,16,19,20; 3-2; 4-1,2,24, 31,32,42,44
Rock pits	2-5,25,26,28; 4-2,44,46
Sitka black-tailed deer	1-6; 2-7,22; 3-2,3,7,8,10; 4-2,3,13
Soils	2-27; 3-37,38,45,47; 4-2,16,31,32,33,36
Sport fishing	3-15; 4-19
Stream Crossings	2-8; 3-22; 4-17,18,33,34,35,44,45
Subsistence	1-2; 2-7,21; 3-3,4,15,18; 4-2,8,9,19

Tiering	1-5
Timber volume class distribution	3-6,45,56,49,50,51; 4-42
Tongass Land Management Plan (Forest Plan)	1-1,2; 2-1,2; 3-15; 4-4,14
Tongass Land Management Plan Revision	3-8; 4-4,6
Tongass Timber Reform Act	1-1,5; 2-1,2,5,25; 3-1,19; 4-17
Trapping	3-30
Transportation	1-3; 2-1,2,26; 3-1,52; 4-42,44,46
Value Comparison Unit (VCU)	1-1,2; 2-3,4; 3-1,2,4, 7,8,15,20,22,31,36,45,46,50 4-13
Vancouver Canada Goose	3-2,15
Visual resources	1-2,6; 2-1,2,4,5,6,8, 13,14,15,16,20,25; 3-30,35; 4-22,23,24,27,28
Watershed	1-2,6; 2-8,13,14,15,16,20,25,27; 3-22,38,41,42,45; 4-17,18,33,35,36,49
Wetlands	2-3; 3-38; 4-32,33
Wildlife	1-2,5,6; 2-1,2,3,4,6, 13,14,15,25,28; 3-8,9,10,11,12,27; 4-2,3,4,5,10,17,44
Winter range	3-6,7,10; 4-3,4,15

Chapter 9

Bibliography

BIBLIOGRAPHY

Aho, R. 1976. A Population Study of the Cutthroat Trout in an Unshaded and Shaded Section of Stream. M.S. Thesis, Oregon State University, Corvallis, Oregon. 87 pp.

Alaska Native Claims Settlement Act. December 18, 1971. Public Law 92-203, 85 Stat.688;US Code 1982 Title 43,Sections 1601 et seq.

Berg, L., and T.G. Northcote. 1985. Changes in territorial gill-flaring and feeding behavior in juvenile coho salmon (*Oncorhynchus kisutch*) following short-term pulses of suspended sediment Can. J. Fish. Aquat. Sci. 42:1410-1417.

Bisson, P.A., and R.E. Bilby. 1982. Avoidance of suspended sediment by juvenile coho salmon. N. Am. J. Fish. Manage. 2:371-374.

Bjornn, T.C., et al. 1977. Transport of granitic sediment in streams and its effects on insects and fish. For., Wildl., & Range Exp. Stn. Bull. No. 17. Univ. of Idaho, Moscow.

Bogardi, Istvan, Lucien Duckstein, and Andras Bardossy. 1989. "Uncertainty in Environmental Risk Analysis", in *Risk Analysis and Management of Natural and Man-made Hazards: Proceedings of a Conference*, Y. Y. Haimes and E. Z. Stakhiv, eds., pp. 154-174, American Society of Civil Engineers.

CFR 219:19 Code of Federal Regulations 36 CFR 219:19 Planning (viable wildlife populations)

Cohen, K. 1989. Wrangell Harvest Study: A Comprehensive Study of Wild Resource Harvest and Use by Wrangell Residents. Technical Paper No. 165. Alaska Department of Fish and Game, Division of Subsistence. Juneau, Alaska. 114 pp.

Goldschmidt, Walter R. and Theodore H. Haas. 1946 Possessory Rights of the Natives of Southeastern Alaska. Report to the Commissioner of Indian Affairs. Manuscript. Washington, D.C.

Harris, S. Arland, Wilbur A. Farr. The Ecosystem of Southeast Alaska, Vol.7 Forest Ecology and Timber Management, USDA Forest Service General Technical Report, PNW-25 1974.

Haupt, H.F. 1959. Road and slope characteristics affecting sediment movement from logging roads. J. For. 57:329-332.

Hawkins, C.P., M.L. Murphy, and N.H. Anderson. 1982. Effects of Canopy, Substrate Composition, and Gradient on the Structure of Macroinvertebrate Communities in Cascade Range Streams of Oregon. Ecology 63:1840-1856.

Hutchison, O. Keith, Vernon J. LaBau, The Ecosystem of Southeast Alaska, Vol.9 Timber Inventory, Harvesting, Marketing and Trends, USDA Forest Service General Technical Report Pnw-34 1975.

Bibliography

- Kruse, J., R. Frazier. 1988. Tongass Resource Use Cooperative Survey. Institute of Social and Economic Research. University of Alaska Anchorage
- Land, C. 1990. Etolin Island Harvest WAA 1901 and Northern Part of WAA 1910. Alaska Department of Fish and Game. 1 p.
- Lewis, Jack and Raymond M. Rice. 1990. Estimating Erosion Risk on Forest Lands Using Improved Methods of Discriminant Analysis, *Water Resources Research*, 26(8):1721-1733.
- McCorison, F. Michael, Gail Johnejack, Everett Kissinger. "A Method to Analyze Watershed Sensitivity," in *Proceedings, Watershed '89, A Conference on the Stewardship of Soil, Air, And Water Resources*, pp. 157-164, USDA Forest Service, Alaska Region, R10-MB-77, 1989.
- Murphy, M.L., C.P. Hawkins, and N.H. Anderson. 1981. Effects of Canopy Modification and Accumulated Sediment on Stream Communities. *Trans. Am. Fish. Soc.* 110(4):469-478.
- Pawuk, H. William, Everett J. Kissinger. Preliminary Plant Association Classification, Tongass National Forest, Stikine Area, USDA Forest Service R10-TP-72 1988.
- Rabich-Campbell, C. 1988. The Bitter Water People: A Cultural Resources Overview of Etolin Island, Southeast Alaska. Unpublished study, USDA Forest Service, Tongass National Forest, Stikine Area Supervisor's Office, Petersburg, Alaska.
- Rowe, W. D. 1989. "Alternative Risk Evaluation Paradigms", in *Risk Analysis and Management of Natural and Man-made Hazards: Proceedings of a Conference*, Y. Y. Haines and E. Z. Stakhiv, eds., pp. 1-21, American Society of Civil Engineers.
- Sidle, W.B., L.H. Suring. 1986. Management Indicator Species for the National Forest Lands in Alaska. USDA Forest Service Tech. Pub. R10-TP-2. 62 pp.
- Smith, B.D. 1980. The Effects of Afforestation on the Trout of a Small Stream in Southern Scotland. *Fisheries Management* 11:39-58.
- Smythe, C. 1988. Harvest and use of fish and wildlife resources by residents of Petersburg, Alaska. Alaska Department of Fish and Game - Subsistence Division. Tech. paper No. 164. 152 pp.
- Suring, L.H., and E.J. DeGayner, P.F. Schempf. 1988. Habitat capability model for bald eagles in southeast Alaska: Nesting Habitat. USDA Forest Service. Draft.
- Suring, L.H., et al. 1988. Habitat capability model for black bear in southeast Alaska. USDA Forest Service. Draft.
- Suring, L.H., et al. 1988. Habitat capability model for marten in southeast Alaska: Winter Habitat. USDA Forest Service. Draft.
- Suring, L.H., et al. 1988. Habitat capability model for river otter in southeast Alaska: Spring Habitat. USDA Forest Service. Draft.
- Suring, L.H., et al. 1990. Habitat capability model for Sitka black-tailed deer in southeast Alaska: Winter Habitat. USDA Forest Service. Draft.

Swanston, Douglas N. 1969. Mass Wasting in Coastal Alaska. USDA Forest Service Research Paper PNW-83, 15pp.

Swanston, Douglas N. 1970. Mechanics of Debris Avalanching in Shallow Till Soils of Southeast Alaska. USDA Forest Service Research Paper PNW-103, 17pp.

Swanston, Douglas N. 1989. "A Preliminary Analysis of Landslide Response to Timber Management in Southeast Alaska: An Extended Abstract," in *Proceedings, Watershed '89, A Conference on the Stewardship of Soil, Air, and Water Resources*, pp. 117-120, USDA Forest Service, Alaska Region, R10-MB-77.

Taylor, R.F. Yield of Second Growth Western Hemlock-Sitka Spruce stands in Southeastern Alaska. U.S.D.A. Forest Service, Alaska Region. Technical Bulletin No. 412. 1934, updated, 1979.

TLMP Revision DEIS 1990 Tongass Land Management Plan Revision - Draft Environmental Impact Statement. 1990. USDA Forest Service. 711 pp.

Tongass Resource Use Cooperative Survey (TRUCS). 1988-89 Maps of Individual Community Subsistence Use Throughout Southeastern Alaska. Database design, map automation, and analysis conducted by North Slope Borough Geographic Information System. Anchorage.

Tongass Timber Reform Act. October 23, 1990. Public Law Report 101-931

USDA-FS. 1977. Southeast Alaska Area Guide. U.S. Department of Agriculture-Forest Service, Alaska Region, Tongass National Forest, Juneau, Alaska. 280 pp.

USDA-FS. 1979. Tongass Land Management Plan - Final Environmental Impact Statement, Part I. U.S. Department of Agriculture-Forest Service, Alaska Region, Tongass National Forest, Juneau, Alaska. 316 pp.

USDA-FS. 1986. R-10 Aquatic Habitat Management Handbook, FSH 2609.24. U.S. Department of Agriculture-Forest Service, Alaska Region, Juneau, Alaska.

USDA-FS. 1990. R-10 Soil and Water Conservation Handbook, FSH 2509.22. U.S. Department of Agriculture-Forest Service, Alaska Region, Juneau, Alaska.

Appendix A

Public Comments and Responses

APPENDIX A

Comments on Draft EIS and Forest Service Response

Draft EIS Published In Federal Register
Final Comment Date

March 29, 1991
May 14, 1991

This appendix includes copies of the letters responding to the Draft EIS and received by May 14, 1991, the final comment date. The ID team also chose to respond to those three letters that were received after the comment deadline. Each comment was numbered in the margin. Following each letter, the numbered comments are either quoted or paraphrased, and the Forest Service response is given.

Commenting Person or Group	Date	Page Number
Joel Hanson	4-11-91	A-1
Phyllis Woolwine	4-17-91	A-6
Open house comments	4-18-91	A-8
Paul Gates, U.S. Dept. of the Interior	5-7-91	A-15
Peter Branson	5-13-91	A-16
Robert E. Lindekugel, Southeast Alaska Conservation Council	5-14-91	A-26
Greg Harris, Mitkof Lumber Company	5-14-91	A-31
Lorraine Marshall, Alaska Division of Governmental Coordination	5-20-91	A-34
R.M. Ziesak, Ketchikan Pulp Company	5-21-91	A-61
Ronald A. Lee, Environmental Protection Agency	6-5-91	A-64

Mr. Richard Strauss
IDT Leader
PO Box 309
Petersburg, AK 99833

Thoms Place

April 4, 1991
APR 11 '91

Info	Act
Forest Supv.	
P.O.	
A.O.	
Eng. Staff	
F&W Staff	
Planning Staff	
HL Staff	
S&W Staff	
Timber Staff	
Paq. Dist.	
Wm. Dist.	

Dear Mr. Strauss,

Thank you for the opportunity to comment on the Starfish. I am honored to be involved in the prototype implementation of New Perspective concepts on the Tongass. Regrettably, the Service's New Perspective and George Bush's New Perspective appear to have the same shortcoming--- they don't substantially change the destructive nature of our activities. However, after reviewing the Starfish DEIS and in an attempt to contribute constructively to your obviously earnest efforts to minimize the adverse effects of roading and logging on north Etolin, I offer the following observations and suggestions for the record.

The Alternatives do not, as you state, "provide a different mix of resource outputs that emphasize different resource values." In fact, with the exception of Alternative 5, the only choice is between 44 MMBF and 52 MMBF. This is a range of only plus or minus 4 MMBF from a median harvest level of 48 MMBF. Cutting the 45 MMBF in the Preferred Alternative will result in the cumulative harvest of 20% of the CFL in the analysis area in less than 10 years, a rate of cut that exceeds the rate of replacement by a factor of more than 2 to 1. It is imperative that the FS analyze alternatives that meet basic harvest sustainability goals in areas like north Etolin. Without the option on choosing such an alternative, one that matches harvest with regrowth, your assurance on page 4-34 for "the continued socio-economic stability of southeast Alaska communities" will prove shortsighted and misleading. It should be a goal of New Perspectives to treat each MA independently and to discourage wholesale liquidation. Furthermore, the lack of any volume class information in the DEIS makes it difficult to assess the degree to which the various alternatives are subjected to hi-grading.

The term 'collateral damage' is used in the military vernacular to describe the death of innocent civilians. You use the phrase 'irreversible loss of resources.' To your credit, as a commercial fisherman I can say that I appreciate your efforts to avoid an irreversible loss of fish stocks on north Etolin--- your risk assessment and development of Alt. 4 have merit in this regard. However, just because deer are not a commercially important species and the subsistence demand is not high, a projected decline of at least 40% in deer numbers in the study area over the long term should not be considered acceptable 'collateral damage.' The NFMA established the direction to manage for viable vertebrate populations. The New Perspectives should seek to go further by actively monitoring MIS population and formulating detailed enhancement or captive breeding and reintroduction programs to be implemented in the event population levels should decline below conservatively projected levels. Having disrupted the natural equilibrium, your responsibilities should be to

maintain healthy wildlife numbers, not merely viable numbers. } 4 (cont.)

On page 3-43 you mention the opportunity to link the existing road in VCU 469 (Olive) to the Starfish network, yet you deny in several places that any link-up is planned for the life of this sale. Your preferred alternative, however, is a virtual if not actual link-up. In fact, it will be extremely difficult to discourage an eager excavator from completing the 900 foot gap during idle time on the weekend. In my estimation, a greater opportunity exists in deleting the cable yarding units entirely s from the south slopes of Anita Bay allowing helicopter yarding in its place, eliminating any roading along this stretch. This would reduce the visual impact of the logging from Zimovia Strait, it would cost less, and it would insulate the Olive Cove road 6272 from being unnecessarily and detrimentally joined to the greater road system. } 5

One of the most-voiced concerns both within and outside the timber industry is for viable small timber sales. The relative isolation of VCU 469 with its existing road and private inholders provides favorable circumstances for truly small-scale, innovative timber sale programs with the potential to contribute to a sustainable community a Olive Cove. New Perspectives should reawaken the FS to the possibilities of Ma and Pa type outfits. On page 4-33 you make certain assumptions regarding the number and value of jobs generated per MMBF. Without discussing the validity of your assumptions let me say that a partner and I with an Alaskan chainsaw mill can fall, buck, slab, sticker, and stack about 2 MBF/day. On a commercial scale using portable bandsaw equipment a team of 4 or 5 workers could theoretically produce 5MBF/day of marketable sawn lumber. This would bring your assumed jobs per MMBF figure up from 7 to about 200. This is, of course, being kept a strictly hypothetical situation by the fact that the FS is actively discouraging this kind of logging practice. New Perspectives should take into consideration a much more diverse range of harvest techniques, not just the most equipment intensive. } 6

Finally, in order for New Perspective concepts to have a chance to work in National Forest management programs it must be capable of allaying the growing concern among Americans over the nation's and the world's deteriorating environment. It is becoming clear that damage control on the public domain may not be an acceptable substitute for protection, enhancement, rehabilitation, and preservation. It may well be that American voters will someday in the foreseeable future choose to cancel the negative effects of forest practices by outlawing clearcut logging altogether on public lands. It should be the goal of New Perspectives to engender a substantive change in forest practices, such that it will present us with models for a sustainable future that nurtures not tortures our planet. } 7

Sincerely,

John Johnson

Box 1783 WRANGELL

Letter from Joel Hanson

- Comment 1:** The alternatives do not provide a different mix of resource outputs.
- Response 1:** The alternatives offer a range of volume from 36 million to 52 million board feet of timber. The study area contains about 20,000 acres of operable CFL. Each alternative takes about 1/10 of that amount. The area is fully capable of producing a sale of this size without causing significant impact on the environment. Sales of lower volume would entail additional entries and decrease economics of each individual offering.
- Comment 2:** It is imperative that the Forest Service choose a harvest pattern that matches regrowth.
- Response 2:** Normally, in the first entry we try to remove 1/3 of the operable CFL. In this case, the Starfish, Quiet, and Granite timber sales have removed approximately 28% of the operable CFL. Over the rotation (100-120 years) all operable CFL not set aside for retention is anticipated to be harvested. Based on the above removal schedule and reentries of similar size (45MMBF) every 20-30 years, we are in line with the allowable harvest rate in the study area.
- Comment 3:** The lack of any volume class information on the DEIS makes it difficult to assess the degree to which the various alternatives are subjected to high-grading.
- Response 3:** The Tongass Timber Reform Act, Title III--Modification of Long-Term Timber Sale Contracts in Southeast Alaska, specifically prohibits "the practice of harvesting a disproportionate amount of old-growth timber. This provision assures that the higher volume classes can be harvested only in proportion to the extent that they currently exist within a management area."
- The intent of this section of the Act as passed by Congress was to limit overharvest of higher volume classes from the long-term sale areas. Section 301 of the Act did not state that independent or short-term sales were mandated to follow the same direction. The DEIS displayed the Forest Service interpretation of the Act as directed by the law.
- Comment 4:** "...a projected decline of at least 40% in deer numbers ...over the long term should not be considered acceptable `collateral damage.'" New Perspectives should go beyond NFMA direction to manage for viable vertebrate populations and formulate detailed enhancement or captive breeding and reintroduction programs in the event population levels decline below projected levels.

- Response 4:** Information on the long-term effects of future timber harvest through the rotation is provided for comparison purposes only, to show how past and proposed harvest fits in with the management direction in our current Forest Plan. It's unlikely current direction will remain unchanged for the next 100 years. The purpose of this EIS and ROD is to demonstrate the changes likely to occur if one of these alternatives is implemented and to decide whether or not any adverse impacts are acceptable. This document and ROD cannot decide whether or not the 40% predicted decline in deer carrying capacity over the rotation is acceptable. If you feel that this level of decline is unacceptable, you need to express your concerns to the TLMP Revision team in Juneau, which is in the process of revising the Forest Plan at this time.
- Captive breeding programs are extremely expensive and generally only used to reestablish populations that have been totally eliminated or to establish new populations where none existed before. It has also been done with upland game birds and some fish species in the lower 48 where demand exceeds the carrying capacity. If deer populations in the study area were to decline due to severe weather or other catastrophe, they would probably be allowed to reestablish on their own since it is so expensive to rear large ungulates in captivity. If the carrying capacity were to decline below demand, it would be cost prohibitive to raise deer for a put-and-take type harvest as is done with upland birds and fish. It is not foreseen at this time that timber harvest would cause the deer carrying capacity to drop below demand.
- Comment 5:** The preferred alternative is a virtual linkup with the Olive Cove road system. It will be difficult to discourage an eager excavator from completing the 900' gap. Linkup is unnecessary and detrimental.
- Response 5:** We apologize for the error on the alternative map in the Draft EIS which led you to believe construction was proposed to within 900' of the Olive Cove system. The actual distance is 0.9 miles as displayed in the transportation section of Chapter 4. Forest Service construction inspection precludes the possibility of this road being constructed other than as designed and specified in the timber sale contract. As to the necessity of the linkup, it is our position that the major benefit of connecting the systems would be to eliminate the necessity for the reconstruction of the log transfer facility in Olive Cove. Future timber volume from the Olive Cove area could be hauled to Starfish Cove and avoid the impact and activity in Olive Cove itself. We agree this linkup is not necessary at this time.
- Comment 6:** South slopes of Anita Bay should be helicopter logged.
- Response 6:** We agree that in the short term, logging in this area with a helicopter and not building any road may be a viable option. However, in the long term, the options for harvesting timber in this area will be greatly enhanced with a road in place. These options include the small-sale program you envision, which would be eliminated if all future harvest and stand management were locked into using helicopter systems.
- Comment 7:** The Forest Service is actively discouraging a "ma and pa" type logging practice.

Response 7:

The Forest Service has an active small sales program. Currently there are three small mills operating on the Wrangell District. One is on each of Etolin, Zarembo and Wrangell Islands. Time will tell if these small operators can make a living. The type of "ma and pa" you describe is severely limited to timber close to salt water and leave strips along existing roads. For small operators, roads constructed by larger sales can provide the access necessary for "ma and pa" operations. Without the larger sales, the only timber available would be the beach fringe, and the beach fringe is some of the more valuable timber for other resources such as wildlife and visual quality. The Forest Service will gladly work with any legitimate proposal for timber harvest within this agency's operational policies and regulations.

RECEIVED
APR 17 1991

Phyllis Woolwine
P.O. Box 2194
Wrangell, AK 99929

April 15, 1991

Richard M. Strauss
IDT Leader
P.O. Box 309
Petersburg, AK 99833

STIKINE AREA
TONGASS NATIONAL FOREST

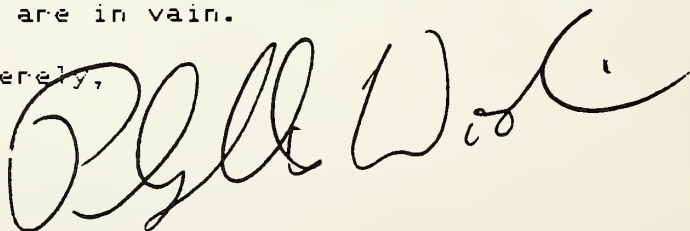
Dear Mr. Strauss,

Thank you for the opportunity of responding to the Starfish DEIS. My interests in this area lie mainly in my role as an ecologist, and as an active participant in the 1990 New Perspectives Conference in Petersburg. I am happy to see that the Forest Service in our region is beginning to actively investigate "New Forestry" principles and other alternatives to traditional forestry practices. My main purpose in this letter is to encourage the Forest Service to take bolder action in this direction. It is become imperative that we rethink the directions our traditional heavily consumptive management practices are leading us. And I think it has long since become obvious that they are not sustainable (economically or ecologically,) that they are highly destructive to forest and aquatic species, and that they are no longer acceptable according to American public opinion.

What remains is that the Forest Service rearrange its priorities so that economics is not the bottom line. The human population has proved through its rapid growth and expansion to be the most adaptive species on earth, surviving in desert and polar regions and even beneath the sea. Here is a time when our population must adapt once again, this time not only for our own survival, but for the survival of thousands of other species. If our economics can be more flexible, and our government willing to support adaptive change, then we could see the timber industry in a creative and supportive role as we change our attitudes toward the forest. This means innovative management practices, but perhaps also a decrease in employment under large timber corporations. Yet here the government can step in to encourage small scale operations, as well as vocational reeducation, and perhaps financial aid in such transitions.

In sum, I would like to see an increased emphasis on gap-cutting, a general preference for helicopter logging, a drastic decrease in reliance on clearcutting (rather than, as in this case, a small sampling of new practices, subjecting the bulk of the cut to traditional clearcutting,) as well as a drastic decrease in the overall cut. Concurrent with this, of course, would have to be programs which ease the transition for loggers into other industries which are more apt to our times. Again you have my greatest support at your first steps in a new direction. Please, however, show the wisdom needed in our times to make more sweeping changes, before our efforts are in vain.

Sincerely,



Letter From Phyllis Woolwine

Comment 1:

The Forest Service has the opportunity to change its priorities and use more innovative management practices by encouraging small-scale timber operations and vocational reeducation, and perhaps providing financial aid to complete this goal.

Response 1:

The Forest Service continues to look for such opportunities. Additionally, the State and Private branch of the Forest Service is involved in the re-education process throughout the state. See also response #7 in the letter from Joel Hanson.

STARFISH TIMBER SALE
OPEN HOUSE
April 18, 1991
Wrangell Ranger District Conference Room

2-4 p.m. Session

Attendees:

Chris Finch	Box 21692, Juneau, AK 99802
John Feller	Box 247, Wrangell, AK 99929
Greg Harris	Box 89, Petersburg, AK 99833
Gayle Gross	Box 11, Wrangell, AK 99929
Bruce Eagle	Box 303, Wrangell, AK 99929

Jerry Jordan
Keene Kohrt
Richard Mendoza Box 1071, Wrangell, AK 99929
Kathy Mohar
Austin O'Brien
Jan Sorochtey
Sue Wise
Carol Jensen
Merrily Jones
Dick Strauss

Comments:

Harris: Commented on the 25-50% profit/risk margin statement in DEIS. Is the profit margin down? Can they cut the profit margin in the appraisal? Helicopter logging should increase the profit margin, not reduce it; there's higher risk with helicopter logging. }1

Gross: When will the sale be offered? }2

Finch: The effort to minimize fragmentation is encouraging. The FS will still go into most of the CFL over the rotation, right? Will the Final have tables to show the percent by volume class being cut (proportionality)? Will the information be available on the VCU level? }3

Gross: There's a mess at Anita camp. }4
Are there plans for fish enhancement for Fishtrap Creek? }5
Have the elk moved into the area? }6

Eagle: He likes what's been done, especially on fragmentation.

7-9 p.m. Session

Attendees:

Marlene Clarke	Box 1020, Wrangell, AK 99929
Allan Hayes	Box 124, Wrangell, AK 99929
Roy Martin	Box 406, Wrangell, AK 99929
Gene Fennimore	Box 165, Wrangell, AK 99929
Joel Hanson	Box 1783, Wrangell, AK 99929

Keene Kohrt
Kathy Mohar
Dave Rak
Dennis Reed
Carol Jensen

Merrily Jones
Dick Strauss

Comments:

Clarke: (Alternative 1) Aren't units in critical habitat? }7

Martin: What's in the future of south Etolin? What's going on on the rest of the island? A large part of the island is gone for logging (i.e., Wilderness, Scenic Byway). }8

Clarke: "You can go out and catch a fish to feed your family but you can't eat wood chips. I want those streams protected." (When assured all alternatives complied with Tongass Timber Reform Act, she said, "Good, I think that's wonderful.")

Hanson: What determines the timber target level? }9

Clarke: Is the timber in the area mostly spruce? (When told that there's lots of cedar in it:) That's going to cost jobs at the mill, since they're exported in the round. }10

Hanson: Will you show proportionality in the Final? }11

Martin: Is there any consideration given to the economic effect on the community? To the social effect of increased unemployment? }12

Clarke: Exporting round logs doesn't make sense. It takes longshoremment longer to load lumber than round logs. They make more jobs if they're processed here. }13

There was a discussion between Hanson/Clarke and Martin over present vs long-term use and value of resources (cut more now so more people can work in the mill vs leave some so our children can also work in the mill).

Martin: He's opposed to clearcutting everything, but he feels industry has given enough. There's too much blue on the (TLMP) map.

Clarke: Clearcutting of 30 years ago is still causing problems on the island (slide area). (Was corrected when she said FS had cut area; it's State land.) If there's timber to be cut and money to be made, somebody will log it. No sympathy for APC. }14

Hanson: Why is Alternative 4 more economic than the "economics" alternative (1)? This needs better explanation in the Final. }15

(In response to a question by Dennis Reed) Relative risk approach is an attempt to quantify, and that's good. Fish numbers are always preferable. We need follow-up monitoring to validate the risk assessment. (Sediment traps are useful monitoring tools.) }16

Fennimore: Zarembo looks like good forestry practice to me.

Hayes: Lodges in the wilderness don't make sense. They lock up the resource for the few/rich.

Responses to Questions Raised at Starfish Timber Sale Open House

- Comment 1:** **Harris:** Is the profit margin down, as it appears in the DEIS?
- Response 1:** The economics shown in the draft are based on mid-market selling values and costs. The purpose is to compare the economics of each alternative. Any attempt to try to determine the profit margin that will be used in the appraisal at this time is inappropriate. The factors affecting logging costs used in the appraisal will be determined after the on-the-ground work is completed. Mid-market analysis is based on a profit margin of 60%. See Response 1, Mitkof Lumber letter.
- Comment 2:** **Gross:** When will the sale be offered?
- Response 2:** August of 1992.
- Comment 3:** **Finch:** will the final reveal the percent by volume class being cut?
- Response 3:** See Response 3, letter from Joel Hanson.
- Comment 4:** **Gross:** There's a mess at Anita Camp.
- Response 4:** There has been a considerable cleanup since Ms. Gross was last there (1990). The cleanup is continuing under the Granite Timber sale contract.
- Comment 5:** **Gross:** Are there plans for fish enhancement for Fishtrap Creek?
- Response 5:** There are no plans for fish ladder construction on Fishtrap Creek at present. Although the barrier falls are located near the middle reach of the system, the inaccessible habitat is not enough to justify a fishway at this time, even if one is feasible. Other enhancement opportunities in the drainage may surface as more time is spent on the ground.
- Comment 6:** **Gross:** Have the elk moved into the area?
- Response 6:** The elk have not moved into the area except for an occasional stray animal. The Roosevelt elk remain concentrated on lower Etolin. All the Rocky Mountain elk have moved greater distances and are not concentrated in any particular location.
- Comment 7:** **Clarke:** Aren't the units in alternative 1 in critical habitat?

Response 7: "Critical habitat" is generally used in referring to habitat essential to the survival of threatened or endangered (T/E) species. The study area has no known T/E species or areas of their critical habitat. Of the non-T/E species in the study area, there are stands of high value habitat, but these stands are not considered essential to the continued existence of any of these wildlife populations. An effort was made while developing alternatives to avoid stands of high wildlife value. Even so, some stands of high value are proposed for harvest in all alternatives, including the preferred alternative. The impacts of logging these high value stands as well as the lower value stands are not considered significant, as displayed in Chapter 4.

Comment 8: **Martin:** Concern that once the Alaska Marine Highway is designated a Scenic Byway, much of Etolin Island will be "gone for logging" (unavailable for harvest because the management emphasis will change from LUD IV, to managing strictly for scenic quality).

Response 8: This concern is understandable, considering the label, "Scenic" Byway. However, current management philosophy is to accommodate timber harvest on lands adjacent to Scenic Byways.

When announcing the establishment of the National Forest Scenic Byways Program, F. Dale Robertson, Chief of the Forest Service, stated that, "...the people who drive [the Scenic Byways] may see some timber harvesting, tree planting, cattle grazing, and wildlife habitat work blended in with scenic beauty."

Direction received by the Alaska Region's forest supervisors for identifying and proposing eligible travel routes for Scenic Byway designation states, "The proposal must be consistent with Forest Plan direction and may include a mix of resource uses including timber harvest and other resource management activities."

The Draft version of the Tongass Land Management Plan revision EIS (Vol. III, page G-33) states, "A Scenic Byway may be comprised of management areas of differing emphasis. [The Scenic Byway will] show the forest user the concept of a 'working forest' with a variety of visual conditions consistent with the designated management area."

These excerpts indicate the current direction of national forest Scenic Byway management in Alaska and nationwide. However, it is true that this management philosophy, as with any land management strategy, may change over time to accommodate evolving public concerns and interests.

Comment 9: **Hanson:** What determines the timber target level?

Response 9: This is a good question and one that is not easy to answer. There are different levels of timber targets: 1) individual sale; 2) Area (Forest); 3) regional (Alaska); and 4) yearly budget level (what is funded for preparation and offer). The following describes each.

Individual Sale: This is determined by the potential of the area where the sale is located. Prior to the planning process, when the sale is put on the timber sale schedule, a professional estimate is made on the sale's potential. As the sale approaches the end of the planning process, better estimates are shown on the schedule as they become known. The final sale volume is determined after the harvest units are marked on the ground and the standing timber is measured. It is normal to have a difference between what is planned and what is finally offered for sale.

**Response 9
(cont.):**

Area (Forest): On the Tongass National Forest, the Stikine Area is equivalent to a Forest down south. An acceptable Forest harvest level is determined by the most current land management plan. The 1979 TLMP effort showed the permissible harvest level (allowable sale quantity) on the Stikine Area to be 108 MMBF/year. Since that time, some further land withdrawals have taken place (i.e. Tongass Timber Reform Act of November, 1990) and a reduction from that level may be required. Even with an established harvest level, targets above or below that can be done as long as the level of 108 MMBF is maintained over time. An example of where harvest levels would increase would be if a disaster such as a windstorm, fire, or earthquake caused extensive mortality that would require an increased harvest level to minimize resource loss. A reason to harvest below the 108 MMBF level would be poor market conditions. The individual sales are aggregated to determine the Forest target for each year. It is important that the estimate for each sale is as precise as possible for the current year.

Regional (Alaska): The regional harvest level is determined by the aggregation of the individual forest land management plans and this level is currently around 450 MMBF. Again, variations in this amount are permissible. The Regional office in Juneau looks at the needs of the timber industry within the region, the capabilities of each Area (Forest), and the situations faced on each sale. They establish, for the Region, the current year's harvest level for which they are funded, and they then assign targets and funds to each forest. Other factors such as agreements with the Small Business Administration, funding for roads, and sale size, factor into the equation as to what volume targets are assessed to each forest.

Budgetary: Within the government, funding levels determine what will be accomplished on the ground. Despite what is planned at all three levels described above, it will be adjusted to the funding levels allocated by Congress.

As you can see there are many factors that determine harvest levels and targets for a sale. When a sale gets closer to offer, the importance placed on the volume level for the sale becomes more critical because this is the level which we had thought and had reported as attainable. Not only industry, but also Congress, is very concerned when what was planned is not produced.

Comment 10:

Clarke: Is the timber in the area mostly spruce?

Response 10:

The final volume per species won't be known until the final cruise, but early indications are that the stands are average for the area, which is 60-70% hemlock, 25-30% spruce, and about 10-15% cedar.

Comment 11:

Hanson: Will you show proportionality in the Final?

Response 11:

See Response 3, letter from Joel Hanson.

Comment 12:

Martin: Is there any consideration of the social effect of increased unemployment?

Response 12:

The effects of unemployment are not shown in the document. See section 4, Table 16 for the estimated number and value of jobs generated by each alternative.

Comment 13:

Clarke: It produces more jobs if timber processing is done here, rather than exporting it to be processed.

Response 13: Current regulations require the domestic processing of all species unless a local market can't be found. To date, only cedar has not found a local market, and has been allowed to be exported. Cedar makes up about 15% of the volume in the study area. Currently, there are 3 small and one large mill experimenting with domestic processing and marketing of cedar in the Wrangell area.

Comment 14: **Clarke:** Clearcutting of 30 years ago is still causing problems on the island.

Response 14: The area you are referring to is near the Wrangell Reservoir. The slides you are referring to occurred on oversteepened slopes mostly on state land. The logging occurred in the early 60's and was downhill, high-lead yarded. We have learned a lot about oversteepened slopes since the 60's, and avoid these type areas if at all possible. On occasion, we log on oversteepened slopes (75%), but require full suspension of the logs above the ground such as provided by a helicopter. We rely on our soils specialists to give their recommendations as to the probability of slope failure even if below 75% slope.

Comment 15: **Hanson:** Why is Alternative 4 more economic than the "economics" alternative (1)? This needs better explanation in the Final.

Response 15: On the short term, this appears confusing, but looking at it in the long term, Alternative 1 provides 30 MMBF available uncut along an existing road system and Alternative 4 leaves 22 MMBF available along a road system at the completion of this sale. That 8MMBF available for a future entry has considerable increased value in the long run. There is also more specified road being built in Alternative 1 which is more expensive than spur road but has a greater economic value over the long term.

Comment 16: **Hanson:** We need 1) quantification of risk assessment and validation, and 2) follow-up monitoring.

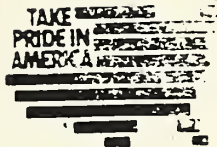
Response 16: We agree that quantitative is better than qualitative, and concrete numbers are better than estimates. Although our approach as presented is not on the advancing front of statistical methodology for environmental risk assessment, neither is it on the trailing edge. In regard to mass wasting and similar events (by far the biggest sediment source in southeast Alaska watersheds), there is no frequency basis to estimate probabilities of events or consequences using conventional statistics. Further, factors influencing such events are vague and unquantifiable. At best, subjective probabilities can be assessed, or "fuzzy sets" can be used to consider the imprecision of non-frequency probabilities (Bogardi, et. al., 1990; Rowe, 1987; Lewis and Rice, 1990). Using this method, "fuzzy numbers" are ranked as an aid in making risk management decisions. Our efforts, in the presentation of data in the form of the text, figures, tables, and maps of the Fisheries, Soils and Watershed sections of chapter 4, are an attempt to mimic the use of the professionally recognized fuzzy set theory in our resource management decision-making. Though our goal is not to become statisticians, we do intend to improve and substantiate our resource decisions using similar ideas in the future.

Please note that this is not an attempt to avoid the use of legitimate statistical procedures in quantifying populations, trends, and the like. For example, statistics *can* be used to answer questions such as the following: "Are sedimentation rates higher in this channel after harvesting than they were before?" and "Is the average summer water temperature higher in watershed A than in watershed B?". These are the kinds of questions that could be answered with precision given time, resources, and long-term, program vision. But when infrequent, large events cause most of the resource damage, environmental risk analysis is where the fuzzy set theory best applies.

Be sure to see the sections on Implementation Monitoring and Effectiveness Monitoring of Soil and Water BMP's. They are now presented in greater detail, and can be found near the end of chapter 2 in this Final EIS.



United States Department of the Interior



OFFICE OF THE SECRETARY

Office of Environmental Affairs
1689 C Street, Room 119
Anchorage, Alaska 99501-5126

ER 91/321

April 30, 1991

Mr. Richard M. Strauss, IDT Leader
USDA Forest Service
Alaska Region
Stikine Area
P.O. Box 309
Petersburg, Alaska 99833

Dear Mr. Strauss:

In response to your request, we have reviewed the Draft Environmental Impact Statement for the proposed Starfish Timber Sale, Etolin Island, Stikine Area, Tongass National Forest. We have no comments to offer at this time.

We appreciate the opportunity to review the draft document.

Sincerely,

Paul D. Gates
Regional Environmental
Officer - Alaska

RECEIVED
MAY 07 1991
STIKINE AREA
TONGASS NATIONAL FOREST

Peter Branson
P.O. Box 2073
Wrangell, AK 99929

Richard Strauss
IDT Leader
P.O. Box 309
Petersburg, AK 99633

Dear Richard M. Strauss:

I want to thank you for this opportunity to comment on the DEIS for the proposed Starfish timber sale. I was glad to see New Perspectives principles included in the plan, though I am sorry to say they seem to have been put in after the plan was already put together. As it stands now, the only alternative acceptable to me is Alternative 5.

While the New Perspectives practices implemented now in alternative 4 will certainly be an improvement for the short term, by 2091 you admit that all operable CLF will have been harvested, except for some beach fringing, precluding any long-term benefits of New Perspectives practices. 1

In spite of the new information presented at the recent New Perspectives conference in Petersburg, you cite a 1934 study (which I couldn't find in the bibliography) as scientific evidence that justifies converting biologically diverse, high-timber quality timber, old-growth forest to habitat-poor, low timber quality, second growth with 100 year rotation. I suspect Taylor's 1934 study was conducted in the lower 48's more productive climate and soil. To cite such a dated source in light of the wealth of recent data is an insult to those working in the field of forest ecology today, many of whom are suggesting that 100 year rotations may not even be biologically sustainable. 2

RECEIVED
MAY 13 1991
STIKINE AREA
TONGASS NATIONAL FOREST

I also have a problem with your data on different volume classes. Only two proposed units are shown in the appendix b in detail giving percentages of volume classes to be cut. There needs to be more tables and maps for percentage of volume classes to be harvested on a unit by unit basis. In table 3-14 you give figures for volume class 3,4,5, and 6. Does this mean there is no volume class 7 in the study area? Or are you combining 6 and 7 even though they are ecologically distinct timber stand types?

3

Without clear tables giving percentage of all volume classes in proposed units it is impossible to tell if high-grading is occurring. Congress enacted the Tongass Timber Reform Act, section 301 (c)(2) to eliminate the practice of high-grading the highest volume old-growth. High-grading can only be eliminated by controlling the volume class proportion to be cut in every timber offering.

The proposed roads in the preferred alternative seem particularly destructive relative to the few units they will access. The road following and crossing Fish-trap Creek endangers a salmon producing creek. Helicopter logging should be used in this sort of situation. The same applies to Pump Creek. The road to Olive Cove should not be built. Not only will it fragment a high value wildlife area and severely visually impact the view from Zimovia Strait, but it's only a matter of time before the short gap between the roads is bridged and the two road systems joined. Again, this is a good case in favor of helicopter yarding.

4

5

I was disappointed to see nothing regarding buffers for class III streams. While there is no minimum buffer for class III streams, it is quite that the law requires some protection. Referring to the Tongass Timber Reform Act, Congressman George Miller, speaking as the house floor manager and for the House conferees, clearly stated

6

that, "It is the Congress' expectation that the agency will now faithfully execute the law and devote it's energy in the future to protecting the lakes and streams of the Tongass beyond the statutory minimum requirements. To condemn class III waters to improper harvesting techniques, such as clear-cutting to streamside, would be absolutely contrary to the intent of Congress."

6 (Cont.)

The preferred alternative is supposed to minimize fragmentation, but it plans to fragment through logging and/or roading 4 out of 5 high value wildlife areas (HVWA) identified. The HVWA at the head of Mosman Inlet would be ^{impacted by} part of two units, 424 and 423. 424 in particular would cut the heart out of the area. The road to Clive Cove further fragments the HVWA at the head of Burnett Inlet, the only access from North to South Etolin for wildlife unable to swim or fly. Cutting units 415, 414, 413 and 411 with their associated roads also fragment and degrade two more of the HVWA's. In total, 4 out of 5 of the HVWA's will be reduced and fragmented by cable logging. Furthermore, these HVWA's will be completely harvested by the end of the rotation. Is this in keeping with the principles of New Perspectives? More than a few hundred feet of beach fringe must be preserved throughout the rotation, and planning for permanent retention of larger blocks of HVWA should be done now.

7

A few other points in regards to wildlife:

- What happened to the elk? I didn't see any mention of them in the DEIS.
- It is misleading to provide figures for deer and bear populations projections without figuring in the great increase in hunting when the logging camp's active, increased access due to more roads, and increased hunting due to population increase.

8

9

The Marbled Murrelet, which is in the process of being listed as a threatened species, is quite abundant in the waters surrounding Etolin Island, yet this bird, which depends on old-growth stands for breeding habitat, is mentioned only briefly in the DEIS. The Pacific Seabird Group recommended in Ketchikan Pulp 5 year EIS,

10

"surveys for Marbled Murrelet activity be carried out in specific old-growth stands before final designation of the stand for logging, and that logging of stands used by Marbled Murrelets be deferred until more information is available on population densities and habitat requirements in the area". The applies for this sale for I am sure the study area contains nests, given the large numbers of birds in breeding plumage I have observed near the sale area.

10 (cont.)

You mention the Marbled Murrelet as an indicator species sensitive to fragmenting and that it requires at least 600 acres, but it is also important to note the specific type of habitat required as well: old-growth, located on slopes of ridge-tops with openings between trees, and having open tree crowns.

Is any current research effort ongoing to determine Murrelet habitat? I believe the Marbled Murrelet is not adequately represented by the other management indicator species and should be designated a MIS.

I have several questions and requests I would like to put forth:

--Concerning figure 4-1: I don't understand how alternative 5 can have a greater cumulative watershed harvest than alternative 1. Is this a misprint? Also, contrary to your statement, it looked to me as if alternative 1 entailed less fish-risk than alternative 4.

11

--I would like to know the specific location of the Etolin canoe (PET-080) and obtain a copy of The Bitter Water People.

12

--Some questions on mitigation:

What does 'rock weathering agent' consist of? } 13

Why does Detailer Creek need rehabilitation? } 14

I am glad to see the forest service considering some more ecologically sensitive forestry practices -- however half-heartedly. New Perspectives is a step in the right direction. Hopefully, with value-added processing to maintain economics, the cut can be greatly reduced, and some form of uneven-age, selective logging (not high-grading) will make clear-cuts a thing of the past. This could help slow, at least in our part of the planet, the present rate of extinction and loss of biological diversity greater than that of the mass extinction of the dinosaurs at the end of the Cretaceous era, 65 million years ago.

Letter From Peter Branson

- Comment 1:** By 2091 all operable CFL will have been harvested, except for some beach fringe, precluding any long-term benefits of New Perspectives practices.
- Response 1:** By 2091 current management would retain all beach, estuary, riparian, eagle buffers, and retention acres for other resource concerns. Currently, 15,881 acres (Table 2-1) of operable CFL exists with approximately 11,000 acres in large blocks (Table 4-3). These acres will be maintained after this entry to allow for new perspective practices in new entries. Prior to 2091 second growth will be of merchantable quality to have a potential of deferring harvest in what operable CFL exists and the remaining 25,000 acres of inoperable CFL. Retaining large blocks of CFL at this time allows flexibility to meet potential future changes in management direction.
- Comment 2:** The source used to justify converting biologically diverse, high-quality timber, old-growth forest to low-quality second growth is outdated. Writer suspects that Taylor's study "was conducted in the lower 48's more productive climate and soil."
- Response 2:** The Taylor study (now cited in the bibliography) was used in the Tongass Land Management Plan. As stated in the TLMP document, "Second-growth yield tables for [this] plan were adapted from published yield tables for young-growth hemlock-spruce stands in southeast Alaska. Although these tables were over 40 years old, they were the standard for predicting productivity of *unmanaged* young growth that follows harvesting of southeast Alaska's overmature old-growth stands at the time." The productivity from "managed stands" will exceed the productivity from unmanaged stands.
- Comment 3:** Is there no Volume Class 7 in the area? Are you combining 6 and 7 even though they are ecologically distinct timber stand types?
- Response 3:** There is very little Volume Class 7 on the Stikine Area and there is none known to exist in the Starfish study area. Based on aerial photo interpretation, there is a 100-acre stand of Volume Class 7 just to the north of the study area along King George Creek near the mouth. This is the only known stand of Volume Class 7 on north Etolin Island. It will not be affected by any of the activities proposed in this EIS.
- Comment 4:** The road following and crossing Fishtrap Creek endangers a salmon producing creek. The same applies to Pump Creek.
- Response 4:** Although the proposed road into the Fishtrap Creek drainage parallels this anadromous stream, the road would be located well out of the floodplain at the toeslopes of the valley and is perched on a bench which separates the stream and road by 800 to 2,500 feet along its length. The crossing has been selected because of the channel's resistance to damage afforded by its bedrock control, flow containment, and narrow width. From the data collected, helicopter yarding does not appear warranted.
- The roads proposed to access timber in the Pump Creek drainage have been located so as not to cross soils having a high hazard for mass failure. No new crossings of Pump Creek are proposed. The data collected do not support the need for helicopter yarding.

Comment 5:

The road to Olive Cove should not be built. It will fragment high value wildlife area and have a visual impact on Zimovia Strait.

Response 5:

Chapter 4, page 14 of the Draft EIS states, "Roads along south Anita Bay are likely to be visible from the bay in only a few short stretches, but would likely be noticeable from Zimovia Strait."

To expound upon this, natural benches were used whenever possible to help screen the road from the water. However, approximately 5 segments of road ranging in length from 200' to 800' are likely to be visible from Zimovia Strait in the background distance zone. In the worst case, a 10' high cut bank and a 15' fill slope would be necessary. Much of the rock in this area is expected to be a light shade of granite, with potential to be highly visible.

In some cases, downhill vegetation was left to help screen the road. In other cases the road passes through the middle of a unit and will be seen. In such a case, visual impacts will diminish substantially within 10 to 15 years as moss and alder cover the fill slopes. Application of a rock weathering agent would help speed the visual recovery by causing the rock to darken to a naturally weathered shade within a week or two of application.

Rock pits serving the south Anita Bay road #6272 have been tentatively identified and await field recon. These sites face away from Zimovia Strait and if developed, would not likely be seen from that travel route.

Fragmentation refers to timber harvest in large blocks of old growth. The effects of roads through old growth stands are not considered "fragmentation" and not considered significant.

Regarding the point about the road linkup, please refer to the letter from Joel Hanson, response 5.

Comment 6:

Protection should be given to Class III streams.

Response 6:

Stikine Area watershed managers share Mr. Branson's concern. Management decisions are usually site-specific and based on on-the-ground review. In some cases--usually those with the most severe slope stability concerns--buffers are prescribed to protect the unstable sideslopes of deep V-notches and gorges. These buffers, in an effort to provide a "buffered-buffer", can be wider than 100 feet. Examples of such can be found in the unit cards for the preferred alternative (See Appendix #). See unit numbers 403 and 419. However, even with buffers or other management practices prescribed (and even in unharvested, unroaded watersheds), high background levels of sediment input will continue due to the occurrence of natural mass wasting events.

Often, however, and contrary to Congressman Miller's condemnation that "clearcutting to streamside" of class III waters is an "improper harvesting technique", it can be best to harvest trees to the banks of class III streams, as long as other BMP's are implemented. Most trees of SE Alaska are shallow rooted. By creating buffers, trees may be subjected to adverse wind effects, causing the trees to function as levers--loosening and stirring the soil around the roots. If high winds are accompanied by heavy rains and/or saturated soils, as is the case in fall storms, then the tendency for mass wasting events to occur is that much greater (Swanston, 1969, 1970). When such events occur in V-notches, results include a large sediment supply directly available to stream, and increased debris loading which may eventually cause in-channel debris flows. Removing all of the largest trees (dominants and co-dominants) would therefore be preferable.

To minimize the destabilization effects which may occur through harvesting-to-streambanks, such as loss of rooting strength in 3 to 5 years (Swanston and Swanson, 1976), several BMP's are often implemented. These may include using channels as splitlines (setting and unit boundaries) so logs are yarded away from the channel instead of across it, directional felling of timber so as to prevent entry of logs and slash into the channel and to aid "splitlining", leaving small, unmerchantable trees, advanced regeneration, and alder along the banks to provide future woody debris sources and mitigate any loss of rooting strength along the banks, partial or full suspension of logs across streams in cases where yarding across the channel is necessary or even preferred, and requiring careful removal of introduced logging slash before the close of each logging season (USDA Forest Service, Region 10 Soil and Water Conservation Handbook, 1991). For examples of how these BMP's are prescribed for implementation, see the unit cards in Appendix B.

Comment 7:

Too much high value wildlife habitat is going to be reduced and fragmented by cable logging. More than a few hundred feet of beach fringe must be preserved throughout the rotation, and planning for permanent retention of larger blocks of high value wildlife area should be done now.

Response 7:

The high value wildlife areas shown on Map 3-2 in the DEIS are those areas which were found to have high wildlife use based on field investigations. These are only parts of much larger old growth blocks, which are displayed in the new Map 4-1 in the FEIS. These other stands either were not checked on the ground or were not found to have much use. Field investigations were concentrated in those stands proposed for harvest in the various alternatives. Stands of high value for wildlife are often of high value for timber as well. It's not possible to have an economically viable timber sale of this magnitude without affecting some high use wildlife areas. An effort was made with Alternative 4 to minimize fragmentation of the remaining large blocks of old growth, especially those of known high wildlife use, but it was not possible to totally avoid these blocks. See also Response #2 in the letter from DGC.

Comment 8:

No mention of the elk in the Draft EIS.

Response 8:

Elk were transplanted in 1987 to the Dewey Anchorage area on south Etolin and the Johnson Cove area on north Etolin. Since the DEIS was published, there have been a few reported sightings in the Pump Creek drainage. It is probable that the elk will spread into the study area and become established at some time. Elk were not raised as an issue during scoping for this project. In their native Oregon and Washington, elk use a variety of habitats including forest, meadows, and clearcuts. The main impact on elk from logging activities are associated with roads in the form of disturbance and increased harvest. At this time, there is no open season on elk on Etolin Island. If and when a season is opened, harvest is likely to be higher in the roaded areas than the unroaded areas. Since most of the elk are currently in unroaded areas and a large part of the island will remain unroaded, the overall impact on the island's elk population should not be significant. There may be a localized reduction in the roaded areas once hunting is allowed, unless different regulations are established in those areas. Poaching is more likely to occur in the unroaded areas where the poacher is less likely to be observed than along the road system.

Comment 9:

Deer and bear population projections should include increases in hunting that will result from an active logging camp.

- Response 9:** After receiving public comments, holding an ANILCA Section 810 hearing, and analyzing Tongass Resource Use Cooperative Survey maps and other data, the Forest Service has determined that this proposed timber sale will have no significant impact on subsistence use in the study area. Details of this determination are presented in Chapter 4 in the Final EIS.
- Prior to road construction in the study area, almost all sport and subsistence harvest was in the immediate vicinity of the shoreline. Roads built to harvest timber facilitate harvest of other natural resources as well, both for sport and subsistence use. With the improved access provided by the road system, there are more big game populations and more area available for hunting, and harvest likely has and will continue to increase. The loggers, some of whom may be local residents, are most likely to hunt along the road systems, rather than in the traditional shoreline areas. Since the areas along the roads are not traditional for subsistence harvest, there should be very little competition with traditional users. Any competition would only be for the life of the sale, which is expected to be five years. Current big game harvest in the area is well below the ability of the population to sustain. The increased harvest from the loggers is well within the capacity of the population to support and, therefore, subsistence users should not be significantly affected.
- Comment 10:** Is any current research going on to determine murrelet habitat? The marbled murrelet is not adequately represented by other management indicator species and should be designated an MIS.
- Response 10:** Marbled murrelets have been proposed for listing in California, Oregon, and Washington, but not in Alaska. Many biologists believe that the murrelet is not endangered in this state. There is very little known about the habitats used by marbled murrelets for nesting in southeast Alaska. We have no models describing carrying capacity for the murrelet. We have not identified any nesting sites of murrelets in the study area, although they probably exist. It is very difficult to locate murrelet nesting areas. We are planning extensive censusing of murrelets on salt water on the Stikine Area this summer. The Anita Bay area will be included in the census and, if time permits, the heads of Mosman and Burnett Inlets will also be included. Since it is very difficult, costly, and time consuming to look for murrelet nesting areas, we don't plan on looking for them in the proposed cutting units. The maintenance of large contiguous blocks of old growth throughout the study area with the preferred alternative should preserve enough nesting areas so that the murrelet won't be significantly affected. Designating the marbled murrelets as an MIS is beyond the scope of this document. Only the Regional Office can designate management indicator species.
- Comment 11:** How can Alternative 5 have a greater cumulative watershed harvest than Alternative 1?
- Response 11:** Figure 4-1, Fish Risk Factors, contained a printing error which has been corrected. The fish-risk ranking, in increasing order of fish-risk, is Alternative 4, Alternative 3, Alternative 1, Alternative 2.
- Comment 12:** "I would like to know the specific location of the Etolin canoe and obtain a copy of "The Bitter Water People."

Response 12: Because cultural resource sites are so vulnerable to vandalism and theft, the Forest Service does not reveal this information. In accordance with Forest Service Manual 6271.2, item 2(c), specific information concerning archeological site locations is not subject to the Freedom of Information Act. The report "The Bitter Water People" contains site specific information and also is not subject to the Freedom of Information Act.

Comment 13: "What does a 'rock weathering agent' consist of?"

Response 13: The rock weathering agent referred to in the Draft EIS is called Permeon, also known as simulated desert varnish. Natural desert varnish, the brown to black coatings that normally form on exposed rock surfaces, is the result of an extremely slow oxidation process. Simulated desert varnish greatly accelerates this oxidation process, acts as a catalyst for the regeneration of real varnish, and also promotes the growth of vegetation.

Applied as a spray, simulated desert varnish is an aqueous solution containing iron and manganese salts, built-in oxidizers, and other trace elements, including copper and zinc. The material is manufactured as a concentrate that can be diluted with water to achieve the desired color intensity. No caustic or alkaline chemicals are included.

Comment 14: Why does Detailer Creek need rehabilitation?

Response 14: Aerial photograph interpretation, supported by stream survey data, show that the lower reach of Detailer Creek was logged circa 1940, using methods which are known to have disrupted fish habitat. The site has yet to be investigated to develop a prescription.

Southeast Alaska Conservation Council

419 SIXTH ST. #328 JUNEAU, ALASKA 99801 • (907-586-6942)



May 13, 1991

Richard M. Strauss
IDT Leader
PO Box 309
Petersburg, AK 99833

RECEIVED
MAY 14 1991

STIKINE AREA
TONGASS NATIONAL FOREST

Dear Mr. Strauss,

The following comments are submitted on the draft environmental impact statement (DEIS) for the Starfish Timber Sale on behalf of the Southeast Alaska Conservation Council (SEACC). We are pleased that the Forest Service is trying to incorporate elements of "new perspectives" in this planning effort. However, while the DEIS generally discusses "new perspectives," it is devoid of clear indications as to how and where these new management techniques will be applied.

General comments:

1. NEPA requires the Forest Service to rigorously explore and objectively evaluate all reasonable alternatives for a proposal. Although the agency claims that "each alternative provides a different mix of resource outputs that emphasize different resource values" (p.2-4), the timber volume contained in each of the alternatives is basically indistinguishable between alternatives. SEACC proposes that different alternatives be developed which consider cutting a reasonable range of timber volume for this timber sale. 1
2. Chapter 1 of the DEIS is entitled "Purpose and Need." However, THE NEED for this project is never presented! We have serious concerns that the Forest Service is frontloading the timber supply pipeline in excess of demand; in fact, no demand analysis was done for this DEIS. The Starfish sale needs to be considered in the context of overall Tongass timber demand analysis -- by far the best place to do this is the TLMP revision. We recommend that no new irretrievable resource commitments be made on Etolin Island until the TLMP Revision process is completed. 2

Under Section 101 of the Tongass Timber Reform Act (TTRA), the Forest Service is directed to meet market demand for timber "to the extent consistent with providing for multiple use and sustained yield for all renewable forest resources." These renewable resources include non-commodity resources such as

subsistence and recreation. SEACC requests that the Forest Service explain the basis for its unstated conclusion that the timber volume offered in the proposed sale is needed to meet market demand. In addition, the agency needs to show that meeting this "need" is consistent with providing for multiple use and sustained yield for all forest resources.

3. The analysis of site-specific impacts is confusing and too generalized. Impacts on the environment need to be disclosed for each unit under each alternative.

4. Cumulative impacts fail to show impacts from past harvesting on all affected resources. Such an analysis is required to adequately assess the impact of the proposal on subsistence uses, resources and areas.

5. The monitoring section needs to be revised and supplemented to describe the specific objectives and standards to be utilized in for monitoring effectiveness of standards and guidelines. Copies of forms to be used for this purpose should be provided and explained.

6. The subsistence analysis is completely inadequate. Given the importance of the Section 810 finding, impacts to specific subsistence areas and resources need to be fully disclosed. The agency should prepare a complete section that discusses both the affects and consequences of the proposed action on subsistence. We were unable to find any discussion in the DEIS which described and analyzed the impacts on subsistence from increased access to traditional subsistence areas, increased competition from logging camps, and the likely reduction in deer availability because of changes in game movement patterns. The final EIS should fully disclose and analyze this information.

7. The DEIS fails to disclose or analyze the amount of each volume class to be cut under this proposal. A table should be prepared that shows how much of each volume class will be harvested in each unit for each alternative. In addition, each alternative should be analyzed so that the public can determine whether the proposed alternative will halt the practice of high-grading the best timber early in the rotation.

Although the high-grading prohibition stated in Section 301(c)(2) of the TTRA applies directly to the long-term contracts, Congress clearly intended to correct this mismanagement practice on the entire forest. In fact, Congress directed the Forest Service to take any other actions required to make its management practices consistent with the reforms contained in Section 301. See TTRA, Section 301(f). For example, as explained by the House Floor Manager and Conference Committee leader, Representative George Miller, "... high-grading should be stopped, whether by the long-term

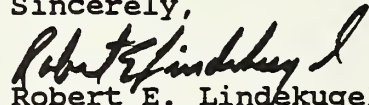
contract holders or by independent operators." 136 Cong. Rec. H12835.

Specific Recommendations:

1. The DEIS discloses the opportunity to link the existing road system in VCU 464 (Anita Bay) to the existing road system in VCU 469 (Olive Cove). SEACC believes that such a link is completely unnecessary. Logging in the general vicinity could be done by small operators. } 10
2. Given the importance of Anita Bay for subsistence uses, SEACC recommends that no logging or road building be approved in the Fishtrap Creek drainage. Of particular concern to SEACC is the fragmentation effect of proposed logging activities in this drainage. } 12

In summary, we believe that some additional analysis is required to correct the deficiencies noted above. Thank you for the opportunity to comment on the DEIS.

Sincerely,


Robert E. Lindekugel
Staff Attorney

Letter from Robert E. Lindekugel, Southeast Alaska Conservation Council

- Comment 1:** "Different alternatives should be developed that provide a reasonable range of timber volume for this timber sale."
- Response 1:** See response #1 to the letter from Joel Hanson.
- Comment 2:** The need for this project is not presented or clarified.
- Response 2:** We agree. This section has been added to the final EIS. Between 1980 and 1989 the Tongass National Forest offered 128 MMBF to independent timber sale operators. Of the 128 MMBF offered, 101 MMBF was sold and 82 MMBF harvested annually. The Starfish sale has the potential of supplying from 36-52% of the timber required to maintain the independent sale industry for one year. The need of this sale by this segment of the industry is critical for the continual supply of timber from public lands.
- Due to the removal of all shelf volume on the Stikine Area during the mid 1980's, no timber volume is available for out years. The Starfish timber sale has the potential of either meeting the immediate need of industry or supplying future volume when timber market conditions improve.
- Comment 3:** The Forest Service should "explain the basis for its unstated conclusion that the timber volume offered in the proposed sale is needed to meet market demand...and that meeting this need is consistent with providing for multiple use and sustained yield for all forest resources."
- Response 3:** See Response number 2, above.
- Comment 4:** "Impacts on the environment need to be disclosed for each unit under each alternative."
- Response 4:** Unit cards for each unit have site specific resource concerns. They contain Forest Service management objectives and mitigative action taken to address any concerns. These cards are in the planning record and are available for public inspection at any time. Unit cards for the preferred are included in Appendix B of the Final EIS.
- Comment 5:** "Cumulative impacts fail to show impacts from past harvesting on all affected resources."
- Response 5:** We agree that it is not clear in the DEIS what the effects are of previous harvest on wildlife carrying capacity. This has been clarified in the FEIS in Chapter 4, wildlife section.
- We don't have the means at this time to quantify impacts on fish carrying capacity. There is an assessment of "relative risk" in the FEIS of past activities and the proposed activities in the action alternatives. This is the best analysis that we can provide at this time.
- Comment 6:** The monitoring section is too vague.

- Response 6:** The effectiveness monitoring section has been revised and is now presented in greater detail. See the Monitoring section toward the end of Chapter 2 in this Final EIS.
- Comment 7:** The Final EIS should fully disclose and analyze the timber sale's impacts on subsistence, specifically addressing the implications of "increased access to traditional subsistence areas, increased competition from logging camps, and the likely reduction in deer availability because of changes in game movement patterns."
- Response 7:** See Response 9, in the letter from Peter Branson.
- Comment 8:** "The DEIS fails to disclose or analyze the amount of each volume class to be cut under this proposal."
- Response 8:** See Response #3 to the letter from Joel Hanson.
- Comment 9:** "Although the high-grading prohibition stated in Section 301(c)(2) of the TTRA applies directly to the long-term contracts, Congress clearly intended to correct this mismanagement practice on the entire forest."
- Response 9:** See Response #3 to the letter from Joel Hanson.
- Comment 10:** The road link to Olive Cove is unnecessary.
- Response 10:** See response 5 to the letter from Joel Hanson.
- Comment 11:** "Logging in the general vicinity of Olive Cove could be done by small operators."
- Response 11:** A sale could be planned for the Olive Cove area that restricts bidding to only small business. Currently, no interest has been expressed for a sale in the Olive Cove area. This would require reactivating the Olive Cove log transfer facility and an environmental analysis. See also response 7 to the letter from Joel Hanson.
- Comment 12:** "SEACC recommends that no logging or road building be approved in the Fishtrap Creek drainage."
- Response 12:** We can find no environmental impact reason to exclude Fishtrap Creek drainage from future timber harvest. The proposed harvest plan and specialist resource reports did not indicate any particular concern that would prohibit the harvesting of timber. There was no indication from the recent ANILCA Section 810 subsistence hearing in Wrangell on June 11, 1991 or upon reviewing the TRUCS study that Fishtrap Creek was a subsistence area that would be adversely affected by road building and logging, as the proposed alternatives indicate.



RECEIVED

MAY 14 1991

STIKINE AREA
TONGASS NATIONAL FOREST

Mitkof Lumber Company, Inc.

Post Office Box 89 • Petersburg, Alaska 99833 • Phone (907)772-3816

U.S. Forest Service
Supervisors Office
P.O. Box 309
Petersburg, AK 99833

HAND DELIVERED

Attn: Richard Strauss - I.D.T. Leader

Re: Starfish Timber Sale - Draft Enviromental Impact Statement

May 14, 1991

Dear Mr. Strauss:

Mitkof Lumber Company has reviewed the above statement and wishes to make the following comments.

The discrepancy exists with the Forest Service's ability to economically implement this timber sale. Chapter 1, page 1, "Purpose Of The Project", states that:

"The. number one purpose of this project is that it contains an adequate volume of timber on operable, commercial forest land to provide a profitable timber sale at mid-market prices."

However, under the summary of consequences in regard to timber,

"all of the action alternatives are identified to be marginally profitable, yielding at the mid-market test approximately 20% - 50% of normal profit and risk margin".

The next point I'd like to make is that apparently the Forest Service will put the burden of applying for Corp. of Engineer permits to allow the watering of the helicopter units on the

purchaser. As this is a time consuming and uncertain step, the Forest Service should take responsibility for this step well before advertisement of the sale. } 2

Sincerely,

Beth E. Schneider
for

Greg Harris
General Manager

cc: Pat Ford
Chilkoot Lumber
file

Letter From Greg Harris, Mitkof Lumber Company

Comment 1: This sale is not an economical offering.

Response 1: A more detailed analysis using the actual R-10 timber sale appraisal system has been done for the Final EIS. Appraisal worksheets have been included in Appendix F.

Comment 2: U.S.Forest Service should apply for Corp of Engineers permits to water logs from helicopter units in Anita Bay.

Response 2: We agree. Application for permits will be made after the Record of Decision is signed.

OFFICE OF THE GOVERNOR

OFFICE OF MANAGEMENT AND BUDGET
DIVISION OF GOVERNMENTAL COORDINATION

CENTRAL OFFICE

P.O. BOX AW
JUNEAU, ALASKA 99811-0165
PHONE: (907) 465-3562

SOUTHEAST REGIONAL OFFICE

431 NORTH FRANKLIN
P.O. BOX AW, SUITE 101
JUNEAU, ALASKA 99811-0165
PHONE: (907) 465-3562

SOUTHCENTRAL REGIONAL OFFICE

3601 C STREET
SUITE 370
ANCHORAGE, ALASKA 99503-5930
PHONE: (907) 561-6131

NORTHERN REGIONAL OFFICE

675 SEVENTH AVENUE
STATION H
FAIRBANKS, ALASKA 99701-4596
PHONE: (907) 451-2818

May 20, 1991

Mr. Richard Strauss
IDT Leader, Stikine Area
U.S. Forest Service
P.O. Box 309
Petersburg, AK 99833

RECEIVED
MAY 20 1991

Dear Mr. Strauss:

SUBJECT: STARFISH TIMBER SALE DEIS
STATE I.D. NO. AK910320-10J

STIKINE AREA
TONGASS NATIONAL FOREST

The Division of Governmental Coordination has concluded the State of Alaska's review of the Draft Environmental Impact Statement for the Implementation Analysis for Starfish Timber Sale, Etolin Island, according to the National Environmental Policy Act (NEPA). We appreciate the opportunity to participate at this stage of planning, and offer a consolidated response on behalf of the State resource agencies. As this review was conducted to satisfy the requirements of NEPA, the State comments include a broad range of issues.

Ultimately, per 15 CFR 930, Subpart C, the timber harvest activity is required to be consistent with the standards of the Alaska Coastal Management Program (ACMP). At the time the USFS submits a federal consistency determination to the State, the State will conduct an ACMP review. Therefore, the State is taking advantage of this opportunity to also preliminarily address potential ACMP issues.

The DEIS references a previous scoping process in December 1987 for an area analysis effort for Etolin Island (page 1-1). This scoping process was canceled by the Forest Service in 1988 to focus on a project-specific analysis for a specified project area rather than the entire island. The USFS initiated a second scoping process in December 1989. A State review number, assigned by DGC, for the second scoping document is not

May 20, 1991

1. The State agrees that the preferred alternative (Alternative 4) appears to be most preferable in maintaining a timber supply for the independent timber sale program, while preventing degradation of water quality, and resulting in the least amount of watershed disturbance.
2. The State is pleased to see Etolin Island selected as a prototype area to develop and implement the concepts of "New Perspectives". We support the concepts of "new perspectives" and are encouraged to see the Forest Service exploring measures we believe will contribute to solving many of the conflicts between timber harvest and other resources of the forest. We offer the following comments on the elements of new perspectives proposed for implementation:
 - a. Internal exclusions: Internal exclusions refers to group green tree retention in cutting units to provide for better second-growth stand diversity, visually screen roads, and modify unit shape to meet enhanced visual objectives. Implementation of these exclusions should be designed to include large dominant trees to withstand windthrow. While OSHA regulations may place limitations on implementing these exclusions when cable yarding systems are utilized, use of shovel yarding techniques may provide more flexibility.
 - b. Group selection: The State supports the implementation of "group selection" in areas of moderate to high visual sensitivity. A concern is that, in selecting trees for harvest, high grading does not occur. }
 - c. Maintenance of large blocks of old growth: We are pleased to see efforts to minimize entry into large, interconnected blocks of old-growth habitat within the analysis area. We approve of the comprehensive assessment of block size and configuration as displayed in the preferred alternative. The State recommends that an allocation tracking system for large blocks of old-growth retention be formalized and maintained so that subsequent re-allocations are accountable to previous retention decisions. This measure will ensure a higher level of accountability for the Forest Service, industry and the public.
 - d. Retention of high value wildlife habitat within beach fringe and estuaries: We approve use of the species habitat capability models to help determine areas of retention, but we do not agree with the method used to

May 20, 1991

referenced in the DEIS. Please advise if the USFS record shows such a number.

The project proposed in the DEIS is one or more short-term timber sales designed for independent timber sale operators. Etolin Island was selected as a prototype area to develop and implement the concepts of the USFS "new perspectives." The new perspective concepts are described in the DEIS as: internal exclusions, group selection, maintenance of large blocks of old growth, public participation, and retention of high value wildlife habitat within beach fringes and estuaries. Five alternatives were analyzed, addressing the following issues of public concern: timber sale profitability, appropriate transportation network, fish habitat, wildlife habitat, and visual quality.

The timber sale offers timber harvest opportunities in an area that includes Anita Bay, Mosman and Burnett Inlets, and the Fishtrap Creek drainage (value comparison units (VCU) 464, 467, and 468), within the Wrangell Ranger District. The land has been designated by the Tongass Land Management Plan (TLMP) as LUD III (provide a combination of amenity and commodity values) and LUD IV (intensive resource use and development where emphasis is primarily on commodity or market resources).

Alternative 4 has been selected as the preferred alternative. This is known as the "minimal fragmentation alternative," which would harvest 45 million board feet of timber on 1,720 acres. An estimated 21 miles of specified road would be constructed. This alternative includes (as do all other alternatives) helicopter logging in order to provide the opportunity to incorporate group selection with helicopter yarding. To provide an economically feasible helicopter sale, additional helicopter clearcut units have been selected. Helicopter units described as both clearcut and group selection are the same in all of the action alternatives. This alternative would harvest 12 percent of the adjusted operable commercial forest land (CFL) in the analysis area; 1,400 acres (37 MMBF) by cable logging, and 320 acres (8 MMBF) by helicopter logging. Timber harvest or road construction would occur in 11 of the 21 Class I fish stream watersheds, and one of the eight Class II fish stream watersheds of the analysis area. Within these watersheds, 15 miles of road would be constructed, requiring 22 additional stream crossings. Alternative 4 harvests the least amount of high value wildlife habitat.

NEPA COMMENTS

The State appreciates the good quality of the DEIS, and feel it sets an example for future environmental documents.

May 20, 1991

select wildlife habitat for retention described on page 2-6 and page 3-6. Using a mean HSI value for all five indicator species to determine retention areas is likely to exclude critically important habitat for some species. For instance, upland habitats important for deer are not protected because they are not important for other MIS species. One goal of the design of this timber harvest plan stated on page 4-6 is the maintenance of biodiversity. Species that have narrow or specialized habitat requirements won't have their habitat protected under the retention prescription. For instance, if the mean HSI value method were used in an area with mountain goats along with many other species, no important mountain goat habitat would likely be protected because goats would be the only animals using cliffs.

We recommend a method of selecting retention for wildlife that would protect a percentage of the most important habitat for each species. Thus, retention might include 20 percent of the most important (highest HSI value) deer habitat, 20 percent of the most important eagle habitat, 20 percent of the most important marten habitat, etc. An alternative would be for retention to be made up of some combination of the most important habitats and the HSI averaged habitats. In any event, some of the highest value habitat for each species should be included in any retention plan. It may be that in the Starfish analysis area, there is little difference in retention areas selected by one method or the other. However, we believe averaging HSI values to determine all retention is not a good precedent and requires further consideration. We suggest additional interagency dialogue between the Draft and Final EIS be undertaken to resolve this issue.

2. Timber harvest by volume class: The DEIS does not display proposed percentage of harvest by volume class by alternative. The State recognizes that the legislative provision in the TTRA which disallows disproportionate harvest of high-volume old growth is specific to the long term sale areas. However, we believe proposed harvest by volume class is valuable information and should be reported in all NEPA documents of all Forest Service timber sales. Although Tables 3-15 and 3-16 on page 3-42 list operable acres and volume by volume class, the document does not go the next step to show what percentage of each volume class would be cut in each alternative. We believe this

additional information is essential for implementation of the new perspectives concepts and to address the biodiversity issue.

3. We suggest the FEIS include a table showing the total number of acres in each unit, and the number of acres in each unit plus adjacent past clearcut units for a cumulative record of the size of second growth blocks. This level of information would be helpful in review at the DEIS stage. } 4
4. While most sections of the environmental consequences chapter went into considerable detail, the analysis section on subsistence effects was scattered in different areas and thus, was not as clear. This is an important issue given the high profile of subsistence and the high percentage of Wrangell residents who subsist on resources in the analysis area. The subsistence analysis also presents a potential conflict. Based on TRUCS data, ADFG Division of Subsistence community studies and other available documents, the Anita Bay area has the highest value for subsistence in the analysis area. In comparing the total acres harvested in the Anita Bay area (Anita Bay area defined as a mile upland from the shore of the entire bay and the Fishtrap Creek Drainage) for the four action alternatives, the potential impact to subsistence harvest ranged from 236 acres to 534 acres. The alternative with the least potential short term impact on subsistence use of the Anita Bay area (VCU 464), based on total acres harvested, would be alternative 1. The Forest Service preferred alternative, number 4, has the highest acreage with 534 acres. Thus a paradox exists. While alternative 4 actually protects more old-growth dependent animals in the analysis area (at least for the short term), alternative 1 may have less impact on subsistence users from Wrangell. From a subsistence use perspective it appears desirable to locate more units away from the Anita Bay shoreline. Further subsistence analysis should address this issue. We are enclosing copies of the most recent summary of TRUCS maps to assist the Forest Service in this endeavor. Original copies can be obtained from our Subsistence Division in Juneau. } 5

The subsistence analysis should also focus on potential impacts of locating a logging camp at Anita Bay and the effect of logging camp personnel on existing subsistence users. For example, the analysis should consider displacement of existing subsistence users, displacement of subsistence resources, and thus reduced subsistence use opportunities. The analysis should seek out general

May 20, 1991

information available which describe uses and impacts associated with the past logging camp location at Anita Bay.

Page Specific NEPA Comments:

P. 2-17 (e): Our NEPA comments in section 2(d) discussed the need for revising the approach to selecting wildlife retention areas. Over the forest rotation the proposed system would likely lead to a retention scheme essentially following the shoreline with a loss in overall biodiversity in the analysis area. While considerable acreage of inoperable timber would also be left, we note that much of this is low volume. } 6

P. 2-18 (1) 1: Canopy gap management is listed as a form of mitigation. While we don't object to this proposal, it is an unproven research technique which should be described as such. } 7

P. 2-18 (1) 3: Further consideration should be given regarding the value to native species of wildlife by planting willow and cottonwood along roadsides. This technique can lead to increased road kill mortalities of birds attracted to this cover during their migrations and is only beneficial to wildlife for a minor percentage of the forest rotation. } 8

P. 2-19, Effectiveness Monitoring: The monitoring section is vague and does not provide end objectives or standards. We do not know how the effectiveness of new perspectives concept implementation will be determined nor what techniques will even be utilized to monitor effectiveness. Also, what remedial actions will be taken if monitoring shows that concept design features or mitigation measures are not effective? } 9

P. 3-3, Subsistence: This subsistence discussion briefly covers the history and present day importance of subsistence in the three VCUs. The discussion from Goldschmidt and Haas on subsistence harvest should also include the importance of VCU 464 to the Wrangell people. Thomas Ukas' statement in Goldschmidt and Haas (1946:128) revealed the historic importance of Anita Bay (VCU 464) to the Wrangell people, "All the Wrangell people used Anita Bay. There were two salmon streams up the bay." Enclosed is a copy of the Wrangell territory mapped by Goldschmidt and Haas supporting the historical importance VCU 464 and the other Etolin Island VCUs had to the Wrangell people. } 10

Our TRUCS maps indicate that Port Protection should be included in the list of communities that are active subsistence resource users of deer (State of Alaska, Department of Fish and Game, Division of Subsistence 1990, Fish and Wildlife Use Map series

for Southeast Alaskan Communities, Volume 2). Port Protection, being so near to Point Baker, would logically use the same harvest areas.

TRUCS data lists deer, salmon, non-salmon finfish, invertebrates, and marine mammals as harvested by Wrangell residents in the Anita Bay area. The Division of Subsistence community study on Wrangell (Cohen 1989:55-63) added black bear and birds to the list of species harvested on Etolin Island. Birds included ducks, geese, and sea ducks. The report states, "The Stikine River flats, the coast of Wrangell Island, Etolin Island... are popular spots" (Cohen 1989:59). We know bird hunting by Wrangell residents on Etolin Island included Anita Bay in the past, but are unsure if the flat at the head of the Bay has returned to its former level of productivity since the last logging occurred there. Efforts should be undertaken to update and incorporate this additional information in this section of the FEIS and incorporated into the later section of environmental consequences on pages 4-5 and 4-6.

P. 3-3, Harvest Records: There is no source given for the first sentence under Harvest Records, "Prior to the severe winters..." Also, it is unclear if north Etolin was the preferred site in all of southeast Alaska for Wrangell hunters, or that north Etolin was the preferred site on all of Etolin Island. Attribution and clarification are needed in this paragraph. } 11

P. 3-4: As we discussed in general NEPA comment 1(d), while the habitat capability models are the best available technique for comparing habitats, there are flaws in the models which need to be considered. The DEIS does a good job in displaying these limitations. Thus when field data is available we recommend it be utilized to supplement the models in order to build a better retention system. If reliable field data becomes available between the DEIS and FEIS we recommend it be utilized. } 12

P. 3-5, paragraph 2, sentence 1: Change to "Cumulative impacts have been addressed...". } 13

P. 3-5, second to last paragraph: The latest iteration of the deer habitat capability model (Feb. 1991) defines optimum deer winter habitat (HSI value of 1.0) as supporting 100 deer per square mile during a mild winter. The FEIS should reflect this change. Also, habitat capabilities for deer under various alternatives throughout the EIS should be adjusted to reflect the output of the new model. } 14

This paragraph gives the impression that in calculating HSI values and habitat capability for deer, and perhaps other

species, the mild winter scenario was used. If so, that is not appropriate. A moderate winter scenario would give the best estimate of habitat capability over the long-term, particularly since the analysis area is in a moderate- average snowfall zone.

P. 3-6: Table 3-1 is mislabeled. What the table displays are not population levels but habitat capabilities which are theoretical population levels. The table gives the impression that it displays the actual numbers of animals in the VCUs for 1954 and 1990. } 15

P. 3-6, paragraph 1: See our previous comments on problems of averaging HSI values for selecting retention. } 16

P. 3-6, last paragraph: We are pleased that high value wildlife habitat for geese and deer was identified and generally avoided in designing alternatives. However, the fact that these mostly upland "key wildlife habitat" areas are not included in the identified retention habitat supports our comments about the problems of averaging HSI values for selecting retention. Further consideration is needed to assess the need for additional allocation of high value upland habitat into retention status (see section 2(d)). } 17

P. 3-9, Fisheries: Reference is made to ADFG numbered anadromous fish streams. The Forest Service should be aware that ADFG cataloging of anadromous fish streams is incomplete and on-going, and that other anadromous fish streams or tributaries used by anadromous fish may exist and be subject to future cataloging. } 18

P. 3-9, Subsistence Fishery: This section states, "No streams within the analysis area have been regulated by ADFG for subsistence harvest." Our files on subsistence salmon permits show permits were issued for Mosman Inlet (Mirkwood) 106-22-10040 in VCU 467 and Navy Creek 106-22-10160 in VCU 468. Subsistence salmon permit data is limited and these sites may not have been readily discernable or not listed in recent years' data. Please consult with the ADFG regarding the validity of these permits and ensure their inclusion in the FEIS reporting. } 19

P. 3-12, (Fish) Productivity/Escapement: In summarizing spawning escapement data, mean escapements are used as the index of relative productivity. Incomplete surveys, different survey techniques, poor visibility and other incidental factors put biases into this technique, especially streams which are not surveyed on a yearly basis and species other than index species. We recommend that peak recorded escapements be added to this in the FEIS to provide a more thorough perspective. For example, the mean escapement listed for "Logjam" Creek is 16,200 while the } 20

Department has a peak recorded survey of 90,000 pink and 600 chum salmon (not an index species) for this stream. "Pump" Creek lists an average escapement of 8,900 fish while ADFG has recorded peak escapements of 100,000 pink and 3,300 chum salmon. In addition, although coho salmon are one of the most widespread salmonids, it should be noted that coho salmon survey data is limited to just a few index streams due to the labor intensity and variable results of coho surveys. Navy and Logjam Creeks are the only coho index streams in the analysis area, with any coho salmon surveys in other streams being incidental.

P. 4-3, High Quality Habitat Remaining, Consequence B: If this paragraph is accurate and cumulative impacts are the same no matter what alternative is chosen, then TLMP is more than a programmatic plan. By its classification of an area as a LUD IV or LUD III, TLMP forces project planners to an inevitable result at the end of a rotation. If most of the operable forest land, less retention, is authorized to be cut by TLMP, then uncertainty about predicting site-specific impacts should be minimized.

P. 4-5, Deer and Marine Mammal Subsistence Harvest: Because of the analogous situation to Point Baker, Port Protection should be added to this list. Also, a paragraph about Port Protection should be added summarizing its subsistence harvest based on TRUCS. The summary statement about the short-term impacts of the proposed alternatives left out other possible impacts. The logging activities (road construction and use) would open new areas to land mammal harvest thereby changing the subsistence pattern of harvest (based on shore access) to possibly a more land based harvest. The logging activities could possibly change game movement patterns thereby limiting traditional access and harvest locations. The roads could allow easier access to areas where game populations were possibly more protected from harvest due to the distance from the shore. This increased access coupled with ease of harvest and the changing game movement patterns may reduce the quantity of deer available for subsistence harvest.

P. 4-5, Deer and Marine Mammal Subsistence Harvest, paragraph 3: The discussion about deer populations available for subsistence is confusing. Currently, the analysis area has 40 percent of the total habitat capability in WAA 1901. Assuming that it will also supply 40 percent of the viable population in the WAA makes 200 animals needed from the WAA for a viable population. Subtracting 200 from the 987 deer theoretically available at the end of the rotation gives about 790 deer. Of those, a sustainable harvest rate of 10 percent would mean 79 deer would be available for harvest annually by hunters.

May 20, 1991

P. 4-6, Subsistence and Sport Harvest Projections: We would like to know how the demand for sport hunting was determined, if it is based on current harvest or hunters' desires for number of deer harvested, and if there is a distinction made between sport and subsistence harvest. Despite its title, the paragraph does not mention subsistence harvest. If demand is based on harvest of all hunters, then the assumption of only a 100 percent increase over current harvest in the next 100 years is probably too low. During the period 1960-68, we estimate average annual harvest by Wrangell hunters from Etolin Island as a whole at about 190 deer (based on Doerr and Sigman, 1986, Human use of Pacific herring, shellfish, and selected wildlife species in southeast Alaska, ADFG). That is over 600 percent higher than current harvest. Deer populations are thought to be below habitat capability now. If deer numbers increase, hunter demand on Etolin may grow accordingly. It is unlikely that harvest would be more than double current kill, although habitat loss may preclude reaching the levels of the 1960's.

22 (cont.)

P. 4-6, Forested Blocks: We appreciate the analysis undertaken to introduce recent ecological concepts in the preferred alternative to maximize wildlife habitat suitability. We support the techniques employed such as prescribing unit layouts to reduce habitat fragmentation and result in larger forest blocks retained, and increased planning sensitivity to forest block locations.

P. 4-8, Table 4-3: The number of forested blocks given for alternative 5 is 6. However, in the location and acreage columns only 5 blocks are listed.

23

P. 4-11, Subsistence Fish Harvest: We believe this section needs to be expanded to deal with questions raised in general NEPA comments item 4 (a through d).

24

PRELIMINARY ACMP COMMENTS

1. Two units (406 and 426) in Alternative 4 have a potential for water quality problems, as they appear to be in high hazard soil areas adjacent to fish streams. Since landslides and erosion (from roads and/or soil disturbance within the unit) are more likely to occur on high hazard soil areas, these two units should be carefully examined. The State is expecting that phase I unit cards (or equivalent display) will be submitted with the FEIS or ROD. These units will be examined in detail when the unit cards are released.

25

May 20, 1991

2. We understand that the USFS will conduct monitoring for BMP implementation and effectiveness in the Etolin Island area. However, the DEIS is not specific as to which areas and which parameters will be monitored (with the exception of unit 418). The topic areas discussed under effectiveness monitoring are appropriate and comprehensive, but more detail is required on how each of these topics will be addressed.

For example, two watersheds, Fishtrap Creek and Pump Creek, will be entered for the first time, thus affording the opportunity to examine the effects of logging on a watershed before, during, and after harvest. Several temperature sensitive streams were identified, including Duckbill Creek, which is an anadromous stream. Such streams could be monitored for temperature effects of logging. Further, one of the objectives of monitoring should be the assurance that harvesting and roading activities are not significantly degrading water quality in the area. Finally, a time frame for monitoring should be included, which could involve the determination of the cumulative impacts of timber harvesting in selected watersheds, over both area and time. The Department of Environmental Conservation is willing to provide assistance in designing a monitoring plan for this area. DEC has also indicated that if a more detailed monitoring plan is not submitted at the time this activity is reviewed for consistency with the ACMP, the following stipulation would be imposed to ensure compliance with the ACMP, 6 AAC 80.140 Air, Land, and Water Quality:

" BMP's for road building and timber harvesting activities shall be monitored for implementation, and for effectiveness at meeting State water quality standards. A monitoring plan including specific water quality parameters and sample sites and schedules will be developed ".

The State encourages the USFS to follow through with effectiveness monitoring and report conclusions regarding windfirm areas and windfirm boundaries. The effectiveness of within-stand leave trees in achieving both wildlife and visual resource objectives should also be reported. These are elements of new perspective forestry that have been used infrequently locally, and should be evaluated prior to becoming standard practice.

3. The State is concerned about crossings of, or activities affecting, anadromous fish streams. Timing of inwater work, including culvert installations, is one way to mitigate impacts. Recommendations at this stage of the planning

May 20, 1991

process require general treatment, and a more detailed review is necessary when site-specific information and structure design are available. Recommendations on general timing windows for the analysis area would include: limiting work to the period May 15 through August 1 for pink and chum systems, June 15 through September 1 for coho systems, and July 18 through the next applicable salmon timing window for steelhead.

27 (cont.)

The ADFG will need to be consulted when detailed site-specific information is available for individual crossings, and a minimum 30-day review opportunity provided (as prescribed under Title 16) where practicable.

4. Another ACMP issue deals with the effects of individual units and roads on high value wildlife habitat. in section 41.17.060(b) of the new Forest Practices Act (the ACMP standard of review for timber harvest activities on Forest Service lands), several standards are applicable to wildlife, as follows:

(c)(1) -- "forest land shall be administered for the multiple use of the renewable and nonrenewable resources and for the sustained yield of the renewable resources of the land in a manner that best provides for the present needs and preserves the future options of the people of the state";

28

(c)(5) -- "There may not be significant impairment of the productivity of the land and water with respect to renewable resources"; and

(c)(7) -- "Allowance shall be made for important fish and wildlife habitat".

It has been our experience that information presented in unit and road cards (or their equivalent), including the specialists' reports, better enable the State to do a detailed ACMP review based on these standards. We recommend both Phase I unit and road cards, unit summaries, or the equivalent measure of display accompany the FEIS. This level of specificity is appreciated and will serve to improve the upcoming ACMP review of this project. In the future, where practicable, we recommend this information accompany the DEIS to allow early identification of issues with adequate specificity for resolution prior to the FEIS.

28 (cont.)

5. Temperature sensitivity of streams (discussed on page 3-12) is a habitat issue under the ACMP. While we believe the

29

May 20, 1991

TTRA mandate for 100-foot buffers on anadromous fish streams and resident fish streams which flow into anadromous fish streams help address this concern, the issue of protection of tributaries to these fish-bearing waters from increased temperatures as well as overall watershed discharge will be reviewed for some watersheds. In the analysis area, ADFG documented temperature-related mortalities in the stream the USFS calls Logjam Creek, in 1988. Additional units are planned in this and the adjacent Pump Creek drainage in this timber sale. The potential for increases in temperature in temperature-sensitive streams will be included in our ACMP review of the final EIS.

29 (cont.)

GENERAL ADVISORIES

The DEIS states that there is an existing log transfer facility (LTF) within the analysis area, located on the south shore of Starfish Cove in Anita Bay. This Starfish Cove LTF was originally designed and constructed in 1983 for the Granite Timber Sale (which has been scheduled for completion in May 1994), and reconstructed in 1985 to a steel H-pile and timber bulkhead with a crane lift-off system. The DEIS does not identify any State review numbers of past State review of these facilities. I located a 1983 review for a "Starfish Cove ramp/dock" (State I.D. No. AK830707-12J, Anita Bay 20. Also, a valid easement (ADL 101714) from the Department of Natural Resources exists. If there are any review numbers for State consistency reviews of the LTF, please let us know. It is helpful when environmental documents provide this background information.

30

The existing LTF is currently scheduled for additional repairs to increase the loading capacity on the bulkhead for larger cranes. The State reviews modifications if the change constitutes an additional impact to coastal resources; thus, the work to increase the loading capacity on the bulkhead may be subject to an ACMP review. A determination as to the need for additional ACMP review of the LTF will require a submittal of your modification plans.

The "Log Transfer Facility Guidelines" were issued in September 1985. Facilities constructed prior to that date are not affected by the criteria in those guidelines unless a modification to the facility after 1985 is proposed. A post-1985 review would utilize the criteria of the LTF guidelines.

DEC has advised that the LTF's are required to have a surface runoff plan, a plan for monitoring bark accumulation, and requires that the disposal of wood wastes be consistent with solid waste regulations under 18 AAC 60.

Mr. Richard Strauss

May 20, 1991

Also, the possibility exists that an additional campsite and sort yard (a logging campsite and sort yard are in existence) may be requested by the contractor. Also, additional USFS administration facilities may be needed. The mitigation measures on page 2-18 reference coho rearing enhancement in Pump Creek drainage and rehabilitation of the mouth of Detailer Creek. These are items that may be subject to an ACMP review. It is possible the facilities could be reviewed along with the FEIS for the timber harvest activity, if the USFS desired to include permit applications at that time.

31

32

Thank you for the opportunity to comment.

Sincerely,



Lorraine Marshall
Project Review Coordinator

Enclosure (Goldschmidt/Haas subsistence map)

cc: Rick Reed, DFG, Juneau
Don Cornelius, DFG, Petersburg
Tom Paul, DFG, Juneau
Jim Ferguson, DEC, Juneau
Daryl McRoberts, DNR, Juneau
Valerie DeLaune, DNR, Juneau
star/lo



DRAFT MAP #1

MAY 1 1991

Areas Used for
Deer Harvest
by Wrangell

WRANGELL BUDGET

Areas shown here have been used during the time residents have been living in the community. The percent of households using each area is calculated from survey responses. Background shading shows areas used by one household and by two or three households.

Sources:

This map is based on data gathered in the TRUCS survey conducted jointly by the Division of Subsistence, ADF&G, the Institute of Social & Economic Research, University of Alaska, and U.S. Forest Service



Data from One Household



Data from Two or Three Households



Less than or equal to 1%



Greater than 1% and Less than or equal to 3%



Greater than 3% and Less than or equal to 6%



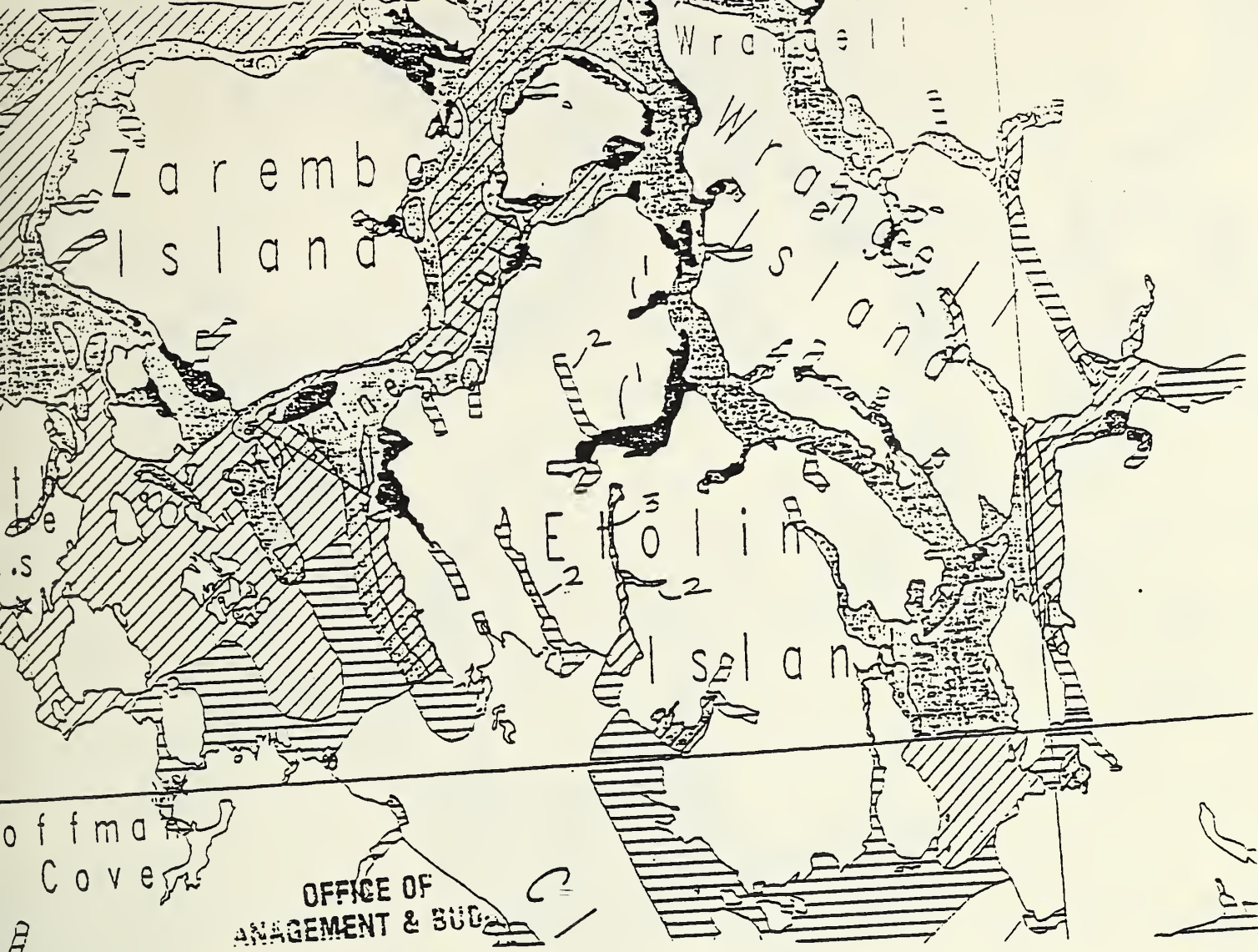
Greater than 6% and Less than or equal to 10%



Greater than 10% and Less than or equal to 15%



Greater than 15%



MAY 01 1991

DRAFT MAP # GOVERNMENTAL COORDINATION

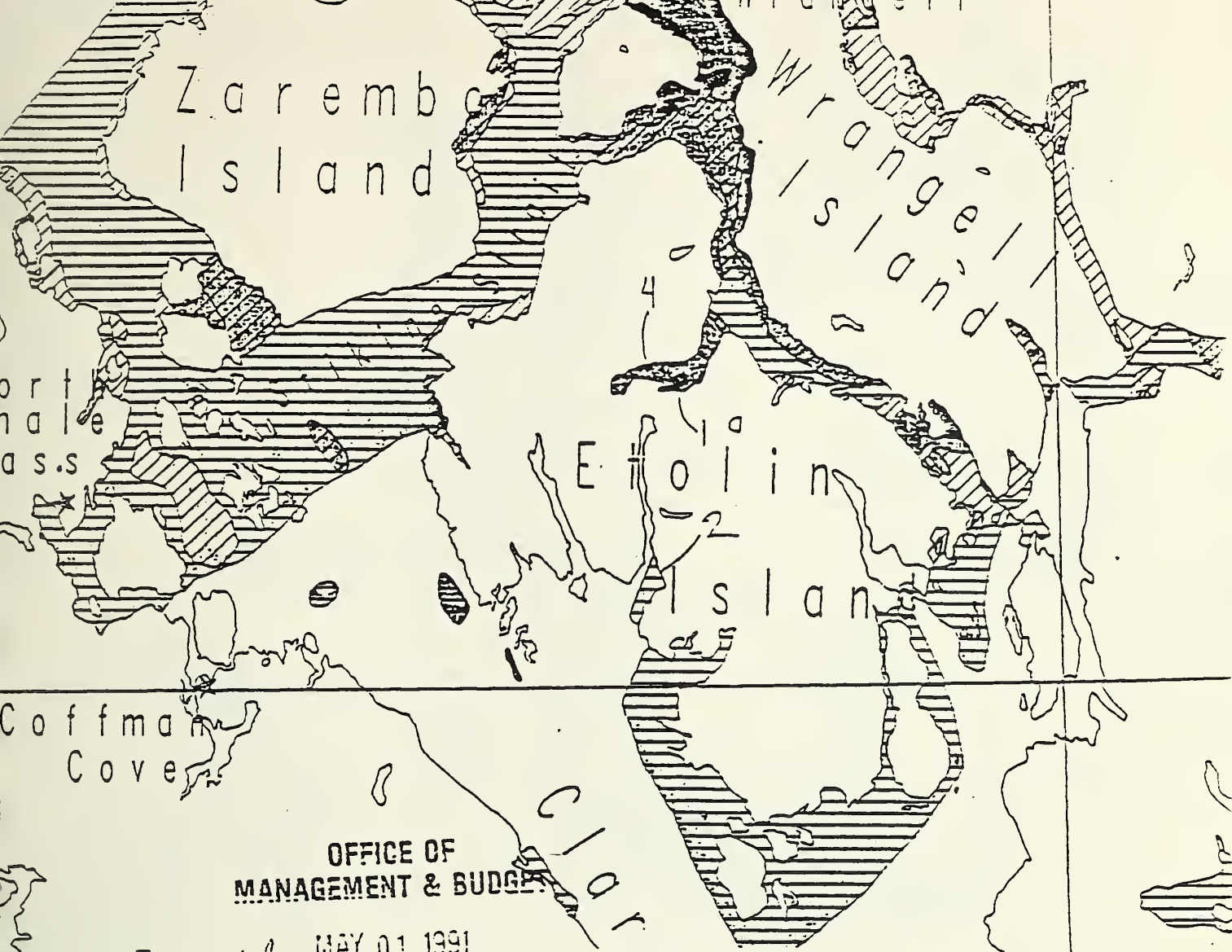
Areas Used for Nonsalmon Harvest by Wrangell

Areas shown here have been used during the time residents have been living in the community. The percent of households using each area is calculated from survey responses. Background shading shows areas used by one household and by two or three households.

Sources:
This map is based on data gathered in the TRUCS survey conducted jointly by the Division of Subsistence, ADF&G, the Institute of Social & Economic Research, University of Alaska, and U.S. Forest Service

- Data from One Household
- Data from Two or Three Households
- Less than or equal to 1%
- Greater than 1% and Less than or equal to 3%

- Greater than 3% and Less than or equal to 5%
- Greater than 5% and Less than or equal to 10%
- Greater than 10% and Less than or equal to 15%
- Greater than 15%



GOVERNMENTAL COORDINATION

DRAFT MAP#

Areas Used for
Marine Invertebrates Harvest
by Wrangel



Data from One Household



Data from Two or Three Households



Less than or equal to 1%



Greater than 1% and Less than or equal to 3%



Greater than 3% and Less than or equal to 6%



Greater than 6% and Less than or equal to 10%



Greater than 10% and Less than or equal to 15%

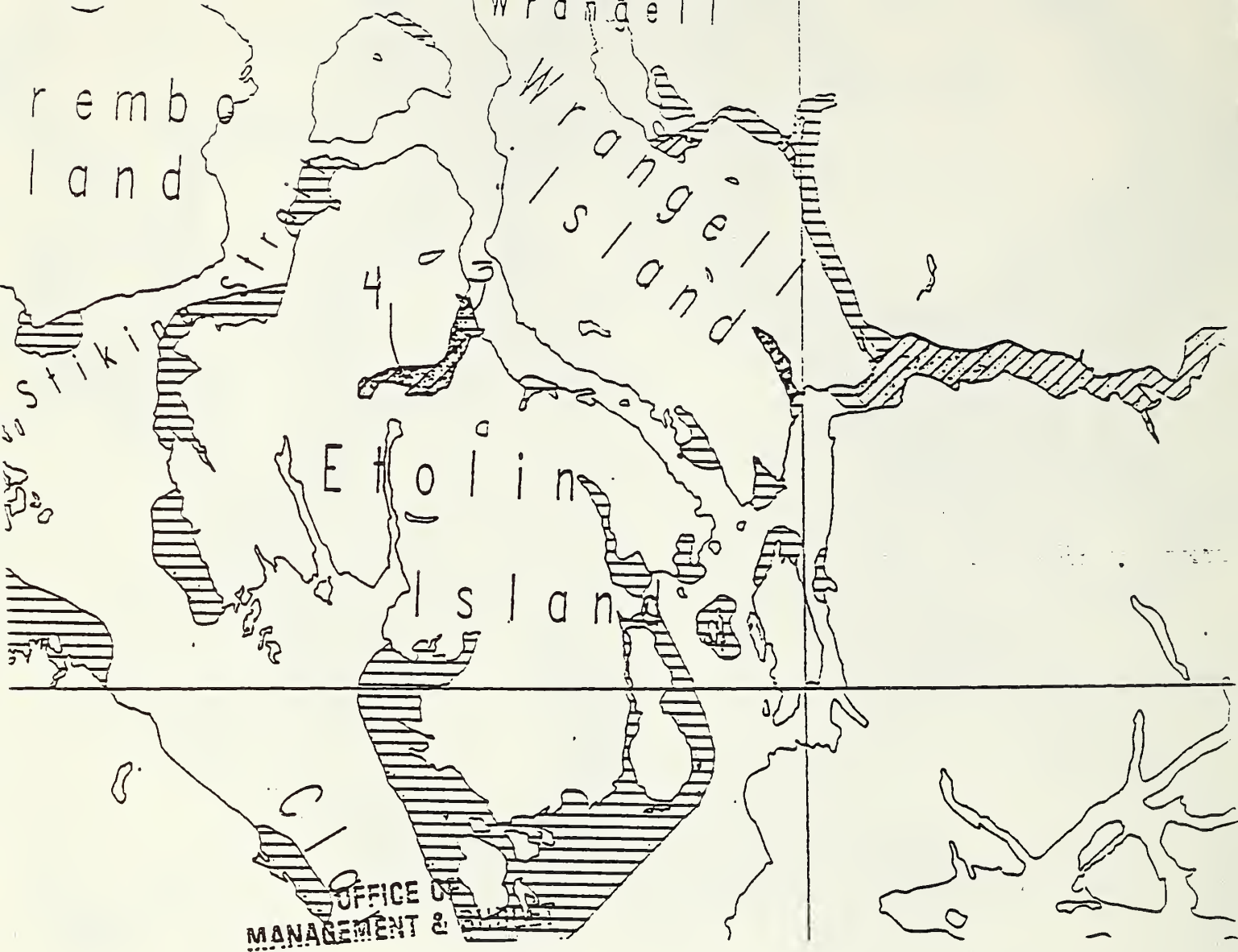


Greater than 15%

Areas shown here have been used during the time residents have been living in the community. The percent of households using each area is calculated from survey responses. Background shading shows areas used by one household and by two or three households.

Sources:

This map is based on data gathered in the TRUCS survey conducted jointly by the Division of Subsistence, ADF&G, the Institute of Social & Economic Research, University of Alaska, and U.S. Forest Service



DRAFT MAP#

GOVERNMENTAL COORDINATION

Areas Used for
Marine Mammal Harvest
by Wrangel



Data from One Household



Data from Two or Three Households



Less than or equal to 1%



Greater than 1% and Less than or equal to 3%



Greater than 3% and Less than or equal to 6%



Greater than 6% and Less than or equal to 10%



Greater than 10% and Less than or equal to 15%



Greater than 15%

Areas shown here have been used during the time residents have been living in the community. The percent of households using each area is calculated from survey responses. Background shading shows areas used by one household and by two or three households.

Sources:

This map is based on data gathered in the TRUCS survey conducted jointly by the Division of Subsistence, ACF&G, the Institute of Social & Economic Research, University of Alaska, and U.S. Forest Service

Letter from Alaska Office of Management and Budget--Division of Governmental Coordination

- Comment 1:** "The state supports the implementation of "group selection" in areas of moderate to high visual sensitivity. A concern is that, in selecting trees for harvest, high grading does not occur."
- Response 1:** See the group selection criteria that have been added to the Final EIS.
- Comment 2:** "We recommend a method of selecting retention for wildlife that would protect a percentage of the most important habitat for each species."
- Response 2:** In the DEIS, average HSI values were used to select retention areas. As stated in your letter, this tends to ignore areas of high value for a single species that has different habitat requirements than other species. This method also does not conform to current Forest Plan direction, although it results in the selection of many of the same areas and approximately the same total acres as required in the plan. Current direction requires that a certain percentage of the acres in each of several categories of habitat be retained. Table 4-7 in the FEIS shows that all alternatives would retain the minimum number of acres in each retention category. Any future timber harvest would also have to follow this direction or whatever direction is in place at the time. Indications are that direction for old growth management will change significantly with the Forest Plan Revision, keying in on retention of large blocks of old growth. For this reason, in the FEIS we did not show specific retention areas. We just demonstrated that we could meet current direction and displayed the old growth areas which would remain after harvest of the preferred alternative. Efforts were made, especially with Alternative 4, to leave large contiguous blocks of old growth, concentrated in areas of high known or expected use. The number and size of these blocks is displayed in Table 4-5.
- Comment 3:** The State believes that, even though Tongass Timber Reform Act does not require it, the Final EIS should display proposed percentage of harvest by volume class by alternative.
- Response 3:** See Response 3, letter from Joel Hanson.
- Comment 4:** "We suggest the FEIS include a table showing the total number of acres in each unit, and the number of acres in each unit plus adjacent past clearcut units for a cumulative record of the size of second growth blocks."
- Response 4:** We have prepared such a table. It can be found in Chapter 2.
- Comment 5:** "From a subsistence use perspective it appears desirable to locate more units away from the Anita Bay shoreline...The subsistence analysis should also focus on potential impacts of locating a logging camp at Anita Bay and the effect of logging camp personnel on existing subsistence users."

- Response 5:** Current and past testimony and public comments, including testimony from the June 11, 1991 subsistence hearing, along with Tongass Resource Cooperative Survey maps all indicate that the Anita Bay area subsistence use is small. Any additional personnel from logging camps may or may not already be subsistence users. TRUCS maps indicate that they will not have a marked impact on subsistence in the area. See also Response 9, letter from Peter Branson.
- Comment 6:** The proposed system of wildlife retention areas would essentially follow the shoreline and result in a loss of overall biodiversity in the analysis area.
- Response 6:** The biodiversity of the area will not be lost. At the end of the rotation, if current direction is followed, 48% of the old growth will still be in its original condition.
- Comment 7:** Canopy gap management is listed as a form of mitigation. While we don't object to this proposal, it is an unproven research technique which should be described as such.
- Response 7:** Concur.
- Comment 8:** Further consideration should be given regarding the value to native species of wildlife by planting willow and cottonwood along roadsides.
- Response 8:** Evidence indicates that many species of wildlife would benefit from the added diversity by planting these two species on the island. Willow cuttings have been successfully planted on the island in the past and are showing signs of browsing. Moose, deer, and elk are known to browse on willows at various times of the year, and a variety of songbirds use both cottonwood and willow for feeding and nesting. While there may be some animals killed by vehicles because of the cover offered by roadside plantings of these species, it is felt that the benefits will exceed any potential losses. Many of the roadsides proposed for planting are spurs which will be closed after logging or side roads which have little traffic. There will also be plantings along streams where animals killed by vehicles won't be a problem. Estimated future traffic after logging will be minimal, as there will be no permanent residents on the island with access to the road system.
- Comment 9:** The monitoring section is vague and does not provide end objectives or standards. We do not know how the effectiveness of new perspectives concept implementation will be determined nor what techniques will even be utilized to monitor effectiveness. Also, what remedial actions will be taken if monitoring shows that concept design features or mitigation measures are not effective?
- Response 9:** The monitoring section has been redone to provide more detailed description of the specialists responsible, what exactly would be monitored, when the monitoring activities would occur and how the monitoring would be done.
- Comment 10:** The discussion from Goldschmidt and Haas on subsistence harvest should also include the importance of VCU 464 to the Wrangell people.
- Response 10:** See Response 5, above.

- Comment 11:** "There is no source given for the first sentence under Harvest Records. Also, it is unclear if north Etolin was the preferred site in all of southeast Alaska for Wrangell hunters, or that north Etolin was the preferred site on all of Etolin Island."
- Response 11:** The importance of north Etolin, and in particular King George, being the preferred hunting site for Wrangell deer hunters appears to be overstated in the DEIS. According to the Tongass Resource Use Cooperative Study, there were many areas that were historically, (pre 1969) important to Wrangell, and their order of preference is not recorded accurately enough. The hunters went where the hunting was the best, the easiest, and where the weather allowed them to go.
- Comment 12:** We recommend field data be utilized to supplement the models in order to build a better retention system.
- Response 12:** Field data has been used in both the DEIS and FEIS where available. The high value wildlife areas shown on Map 3-2 in the DEIS are field verified high use areas. This has been clarified in the FEIS.
- Comment 13:** Change the sentence on p. 3-5.
- Response 13:** The intention with the use of "will be" was that these impacts "will be" addressed in Chapter 4. This paragraph has been deleted from the FEIS.
- Comment 14:** a) "The latest iteration of the deer habitat capability model (Feb. 1991) defines optimum deer winter habitat as supporting 100 deer per square mile during a mild winter. The FEIS should reflect this change. b) Habitat capabilities for deer under various alternatives throughout the EIS should be adjusted to reflect the output of the new model.
- Response 14:** a) The models were run before the iteration was available. This change has been made in the FEIS.
b) The paragraph you refer to was just an example of how the models work. This has been clarified in the FEIS. The moderate winter scenario was used for calculating deer carrying capacity. For determining areas of high average HSI value, the mild winter scenario was used since it had values up to 1.0, whereas the moderate winter scenario only has values up to 0.64. If these latter values were used, areas of high value for deer would tend not to be selected.
- Comment 15:** "Table 3-1 is mislabeled. The table actually displays habitat capabilities which are theoretical population levels."
- Response 15:** We agree. The table title has been changed.
- Comment 16:** Reference to previous comments on problems of averaging HSI values for selecting retention.
- Response 16:** See Response 2, above.
- Comment 17:** Expressed concern that high value goose and deer habitat was not selected for retention.

- Response 17:** See Response #2. The majority of the areas you referred to have been avoided with all alternatives. Since old growth management will probably be treated differently in the Forest Plan Revision, we don't want to designate retention areas at this time, only recommend possible areas.
- Comment 18:** ADFG cataloging of streams is incomplete and ongoing.
- Response 18:** Concur. The fisheries section has been edited to show this. "The listing of ADFG-numbered anadromous fish streams provides a reference of known value to date. Cataloging of streams is a continual process, with inventories conducted by ADFG and USDA-Forest Service resulting in catalog updates annually. The analysis includes field inventory to determine presence/absence and upper limit of fish species in streams of the study area."
- Comment 19:** Subsistence fishing data on permits issued is incomplete and not necessarily accurate.
- Response 19:** The section on subsistence fishery will be edited to reflect this new information. The number of permits issued, the dates they were issued, and the number and species caught will be included upon consultation with ADFG.
- Comment 20:** Peak escapements recorded should be added to the Fish Stream Productivity Table.
- Response 20:** Concur. Peak escapements will be added to the Fish Stream Productivity Table and an explanation of the general lack of coho escapement data will be included in the narrative.
- Comment 21:** If the paragraph on page 4-3 is accurate, and cumulative impacts on high quality habitat are the same no matter what alternative is chosen, then TLMP is no more than a programmatic plan.
- Response 21:** The projections to the end of rotation are for information purposes only to show how the alternatives discussed in this EIS compare to Forest Plan direction for the area. Too much emphasis should not be placed on these numbers since we cannot accurately predict future management direction 100 years from now. The main purpose of this document is to display the consequences of this proposed timber sale.
- Comment 22:** a) Port Protection should be added to the deer and marine mammal subsistence harvest list. Port Protection's subsistence harvest should be summarized in this section. b) Logging activities could alter harvest patterns, access, and quantity of deer available. c) The discussion about deer populations available for subsistence harvest is confusing.

- Response 22:** There is no way to distinguish sport harvest from subsistence harvest of game in Southeast Alaska, since both require a State sport hunting license and the appropriate tags and harvest tickets; and the seasons, bag limits, and methods of take are the same. Most of the harvested deer you refer to come from south Etolin Island where the population and chance of success are higher. Original deer carrying capacity of Etolin Island was about 7,000 deer. With past harvest and logging of the preferred alternative, the island would still support approximately 6,880 deer. This is enough carrying capacity to support many times the level of harvest you quote from the 1960's, if the deer population ever recovers its former level.
- a) Historically, Port Protection residents used the study area, but in recent times they have not. Only residents of Wrangell, Point Baker, and Petersburg have demonstrated recent subsistence use in the study area, and so were the only communities addressed in the EIS. Adding Port Protection to the list of users would not significantly change our analysis. Anticipated use by residents of that community is very low due to the distance they would have to travel over potentially treacherous waters as well as the much greater abundance of game in close proximity to that community.
 - b) See Response #9, letter from Peter Branson.
 - c) We concur. This has been clarified in the Final EIS.
- Comment 23:** In Table 4-3, the number of forested blocks given for alternative 5 is 6. However, in the location and acreage columns only 5 blocks are listed.
- Response 23:** The table was incorrect. The table has now been totally reformatted, the blocks re-delineated, and the text rewritten in the Final EIS.
- Comment 24:** The subsistence fish harvest section needs to be expanded to deal with questions raised in general NEPA comments item 4 (a through d).
- Response 24:** See Response 19, above.
- Comment 25:** Two units in high hazard soil areas have high potential for water quality problems.
- Response 25:** The two units, as well as several others, were visited by several USFS resource personnel, including a soil scientist, geotechnical engineer, hydrologist, logging systems engineer, and fisheries biologist.
- In unit 426, high hazard soils were found on the upper portions of the slopes, and the backline of the unit boundary was adjusted to eliminate these high hazard soils from the unit. Additionally, road access into the unit was deemed difficult and risky due to multiple ridge/swale on deep till soils. Further on-site review revealed good road access on a "bench" landform on the north/northeast side of Wetbeck Creek, and the road was relocated to the north/northwest side of the creek. The valley landform permits yarding the unit to landings along the road using full-suspension procedures to cross what is an AHMU class III stream.
- In unit 406, two settings were dropped from the southern end of the unit due to the occurrence of oversteepened slopes.
- Note that unit cards for the preferred alternative are included in this Final EIS (Appendix B). Unit cards for each of the other action alternatives are on file in the planning record, and are available for public review.
- Comment 26:** The DEIS has vague coverage of Implementation and Effectiveness Monitoring Plans.

- Response 26:** The plans for both the implementation monitoring and effectiveness monitoring of soil and water BMP's are now presented in greater detail. They are believed to be consistent with the ACMP. See the Monitoring section toward the end of chapter 2 in this Final EIS.
- Comment 27:** The state is concerned about crossings of, or activities affecting, anadromous fish streams.
- Response 27:** Detailed site specific information has been included on the road cards displayed in the Final EIS.
- Comment 28:** Because of the detail in which they describe the effects of individual units and roads on high value wildlife habitat, "in the future, where practicable, we recommend both Phase I unit and road cards, unit summaries, or the equivalent measure of display accompany the DEIS. [This would] allow early identification of issues with adequate specificity for resolution prior to the FEIS."
- Response 28:** This information has been available in the planning record, and can be examined by the public at any time, which was so stated in the Draft EIS, Appendices B and C.
As to the question about preservation of high value wildlife areas, not much emphasis should be placed on saving small blocks of high value habitat unless that is all there is of a very unique habitat type (for example, the goose nesting areas identified around the small ponds west of Anita Bay). What's more important for most species is the "big picture" -- the condition of the whole area. For example, preserving large tracts of moderate value deer winter range capable of supporting hundreds of deer is more important to the population than preserving one or two small stands of high value that are only capable of supporting one or two deer.
- Comment 29:** Temperature sensitivity of **Class III** and other tributaries to class I streams needs to be addressed.
- Response 29:** We agree. Temperature sensitivity of **Class III** streams is an issue worthy of considerable discussion and action. Canopy removal will likely result in increased streamwater temperatures, especially in streams with east-west orientation, high width/depth ratios (wide and shallow), lower gradient, bedrock substrate, and/or whose upstream watershed contains a significant proportion of lakes and muskegs. The best means to prevent detrimental increases in water temperature is to maintain as much shading as possible. Prescriptions for such channels during timber harvesting activities may include leaving a buffer on the south side of east or west-flowing streams, and leaving unmerchantable timber on both sides of streams with other orientations.
Fortunately, several factors appear to naturally mitigate temperature increases of streams which flow through harvest units. Topographic shading of streams occurs because of the mountainous or rolling landforms surrounding **Class III** streams in southeast Alaska. Many **Class III** streams are somewhat (or very) incised into the landform which also acts to shade the channels. Further, upper watershed **Class III** streams are often small and narrow. The height of the ground cover needed to shade these narrow channels is minimal (one estimate for the Petersburg, Alaska area is 3, 6, and 12 feet of cover for 2, 4, and 8-foot wide streams, respectively; see AHMU Handbook) and is often satisfied by increased brush growth after harvesting. High gradient channels will reduce the time water is exposed to the sunlight. Consequently, water temperatures are less likely to rise significantly. It is also thought that the coolness beneath the forested canopy downstream of a unit acts to reduce streamwater temperatures, especially on steep channels with higher energy dissipation.

- Comment 30:** We should request state review numbers for the facilities in Starfish Cove, if available. Maintenance of the existing bulkhead may be subject to ACMP review. LTF's are required to have a surface runoff plan, a plan for monitoring bark accumulation, and disposal of wood wastes must be consistent with solid waste regulation under 18 AAC 60.
- Response 30:** The state ID number, tideland easement number, and corps of engineers permit number have been included in the Final EIS. The repairs mentioned in the Draft EIS did not have any impact on land outside of the area already occupied by the bulkhead. This maintenance was completed early this spring. The LTF is scheduled for operation this summer and will be in compliance with all stipulations which are required to assure that the activity is consistent with the Alaska Coastal Management Program.
- Comment 31:** The possibility exists that an additional campsite, sortyard, and U.S.F.S. administrative facility will be needed. These items may be subject to ACMP review. These could be reviewed along with the Final Environmental Impact Statement for timber harvest activity, if the Forest Service desired to include permit applications at this time.
- Response 31:** The need for an additional campsite and sortyard is so uncertain that we prefer not to apply for permits at this time. The Forest Service administrative facility will obtain the necessary permits.
- Comment 32:** The mitigation measures for coho rearing enhancement in Pump Creek and rehabilitation of the mouth of Detailer Creek may be subject to ACMP review.
- Response 32:** Before project implementation, an ACMP review will be requested.



Ketchikan Pulp Company

Post Office Box 6600
Ketchikan Alaska 99901
907/225-2151

May 15, 1991

Richard M. Strauss
IDT Leader
U.S.D.A. Forest Service
Stikine Area
P.O. Box 309
Petersburg, AK 99833

Dear Richard:

Following are Ketchikan Pulp Company's comments on the Starfish Timber Sale Draft Environmental Impact Statement.

KPC supports the Forest Service Preferred Alternative 4 with some modifications.

With the addition of units 206, 207, 216 and 217 from Alternative 2 a more viable timber sale is created from both an economic and operational standpoint. These units are on the proposed road system and would require no further construction. Also, unit 406 should be enlarged to the Alternative 2 size.

KPC supports the idea of internal exclusions when they do not hinder operability. Your proposed exclusion in unit 404 would create a safety problem when trying to meet guyline circle requirements. It should be dropped. } 1

KPC also supports including the road on the east side of Mossman Inlet as a part of this preferred alternative. It makes sense to get NEPA coverage on this portion of the road system now rather than going through a separate process. } 2

We are concerned that the proposed percentage of timber to be removed in the Helicopter Group Selection Units is not enough to make the operation safe. We realize the goal for } 3

RECEIVED

MAY 21 1991

STIKINE AREA
TONGASS NATIONAL FOREST

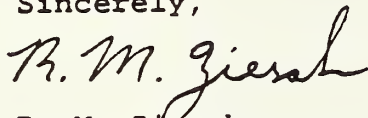
TIM173.RMZ

Richard M. Strauss
May 15, 1991
Page 2

this experimental harvest is to make less impact on visuals but we feel that safety should be first, this should be examined more closely before the sale is offered.

Thank you for the opportunity to respond to this EIS.

Sincerely,



R. M. Ziesak
Contract Supervisor/Timber Planning Manager

:mk

cc: O. J. Graham
W. J. Begalka
T. G. Hicks

TIM173.RMZ

Letter from R. M. Ziesak, Ketchikan Pulp Company

- Comment 1:** Internal exclusion in unit 404 is a safety problem and should be dropped.
- Response 1:** When the unit layout is verified in the field it will be determined if the exclusion is a safety concern and will be modified or excluded at that time.
- Comment 2:** KPC supports including the road on the east side of Mosman Inlet as part of the preferred alternative.
- Response 2:** To include additional road that is not needed into an alternative changes the overall intent of an alternative and is predetermining future management opportunities. We do not agree with this suggestion in this situation.
- Comment 3:** KPC is concerned that the helicopter group selection units are creating an unsafe operation situation.
- Response 3:** This will be looked at during the layout. The Forest Service is consulting with helicopter companies that do helicopter logging to best obtain the management goals, yet do it in a manner that will provide for a safe operation. Rocky Mountain Helicopters, with an office in Ketchikan, has successfully and safely logged using helicopters in southeast Alaska.



JUN 5 1991

REPLY TO
ATTN OF:

WD-136

Ronald R. Humphrey
Forest Supervisor
Stikine Area
Tongass National Forest
P.O. Box 309
Petersburg, Alaska 99833

Stikine Area	
JUN 10 '91	
Info	Act
✓ Forest Supv.	✓
P.O.	
A.O.	
Eng Staff	
F&WL Staff	
Planning Staff	
RL Staff	
S&W Staff	
Timber Staff	
Pubg. Dist.	
Wmnl. Dist.	✓

Return to me

Dear Mr. Humphrey:

In accordance with our responsibilities under the National Environmental Policy Act (NEPA) and § 309 of the Clean Air Act, the Environmental Protection Agency has reviewed the **Implementation Analysis for Starfish Timber Sale, Etolin Island Draft Environmental Impact Statement (draft EIS)**. This draft EIS evaluates five timber harvest alternatives. The action alternatives range from 44 to 52 million board feet with a project area of 40,308 acres.

Based on our review, we have rated the draft EIS EC-2 (Environmental Concerns - Insufficient Information). Our main concern is the effect of the action alternatives on water quality and fisheries. Additional information is needed on monitoring, and mitigation. This EIS has a generally clear presentation of alternatives and shows attention to the principles of New Perspectives. Our detailed comments are enclosed.

Thank you for the opportunity to review this draft EIS. Please contact Wayne Elson at (206) 553-1463 if you have any questions about our comments.

Sincerely,

Ronald A. Lee, Chief
Environmental Evaluation Branch

Enclosure

cc: Drew Grant, ADEC
ADFG
NMFS

Detailed Comments for
Implementation Analysis for Starfish Timber Sale, Etolin Island
Draft Environmental Impact Statement

Water Quality and Fisheries

Several statements in the draft EIS concerning water quality and fisheries appear contradictory:

"It has been extremely difficult to determine specific cause-and-effect relationships between some forest management practices and variations in salmonid populations." (page 4-8)
"Crude measures of relative, not absolute, risk to fisheries..." (page 4-9)
"All of the alternatives would present some risk to fisheries (page ii)." "A small amount of soil sliding and slumping is likely. Roads proposed to be built on high hazard soils will be field verified prior to the Final EIS." (page 4-21)
"No noticeable long-term effects should occur as Southeast Alaska watersheds tend to recover quickly due to the resilience of the forest vegetation." (page 4-31).

We conclude that because reliable prediction methods are unavailable and the uncertainty of the water quality effects of timber harvest, a high amount of conservatism is needed and increased attention to implementation and effectiveness monitoring is needed.

All potential harvest units must have topographic detail and sufficient scale to identify after courses, landings, and road locations and slope steepness. The detail presented should be similar to that provided in the sale plan and contract. Water sources for road construction and rock source location should also be identified.

Monitoring

A description of the feedback mechanism which uses the monitoring results to adjust standards and guidelines, best management practices, standard operating procedures, intensity of monitoring, and timber sale administration when adverse effects are first detected. Providing such a process for adjustment will ensure that mitigation will improve in the future and that unforeseen adverse effects are recognized and minimized.

Details of the monitoring plan should be expanded to include types of surveys, location and frequency of sampling, parameters to be monitored, indicator species, budget, procedures for using data or results in plan implementation, and availability of results to interested and affected groups. Linkage to Table 3.2. Alaska Department of

Fish and Game (ADF&G) Numbers Streams and specific harvest units would be appropriate.

Mitigation

A comprehensive discussion of proposed mitigation for direct, indirect and cumulative impacts is required by the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA. The CEQ regulations indicate that an EIS should include the means to mitigate adverse environmental effects (40 CFR 1508.7) as well as disclose the effectiveness of the mitigation measures to minimize adverse effects.

Site specific details on the effectiveness of mitigation are appropriate for a site specific timber sale. The EIS should provide a quantitative (if possible) or qualitative description of mitigation effectiveness. Prior timber sales in the Tongass National Forest could be used as a basis for these discussions.

This need is fully consistent with EPA's Antidegradation Policy (40 CFR 131.12). This policy includes provisions that: No activity is allowable which would partially or completely eliminate any existing beneficial use of a waterbody, whether or not that use is designated in a state's water quality standards. In such a circumstance, the planned activity must be avoided or adequate mitigation/preventive measures must be taken to ensure that the existing uses and the water quality to protect those uses will be fully maintained.

Of the twelve steps, lettered a through l, listed on page 2-17 to mitigate consequences; steps (a), (b), and (l) seem out of place. (a) and (b) should be listed as contingencies not mitigation. (l) appears to be a list of enhancement measures for existing conditions. These should not be considered mitigation. "Mitigation" includes: (1) Avoiding the impact altogether by not taking a certain action or parts of an action; (2) Minimizing impacts by limiting the degree or magnitude of the action and its implementation; (3) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment; (4) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; (5) Compensating for the impact by replacing or providing substitute resources or environments.

Federal Consistency Provisions of § 319 of the Clean Water Act

§ 319 includes water quality assessments and a nonpoint source (NPS) management program. The assessment identifies water that cannot reasonably be expected to attain or maintain applicable water quality standards or goals without control of nonpoint sources. The NPS program identifies Best Management Practices and programs to achieve implementation.

The Federal consistency provisions of § 319 represent an opportunity for State and Federal agencies to more closely coordinate their activities and cooperate in achieving water quality goals. If the State determines that a Federal application or

project is not consistent with the provisions of its NPS program, the Federal agency must make efforts to accommodate the State's concerns. Executive Order 12372 provides guidelines for using the State intergovernmental review process for conducting § 319 Federal consistency reviews.

This EIS needs to integrate § 319. Existing water quality conditions in NEPA documents need to reflect and reference the state's water quality assessment. Direct or indirect nonpoint source water quality effects need to be reduced through design and through mitigation measures to insure that the project is consistent with the state's NPS program. The contact for the Alaska Department of Conservation is:

Drew Grant
Nonpoint Source Coordinator
Alaska Department of Environmental Conservation
P.O. Box 0
Juneau, Alaska 99811
Phone: (907) 465-2653

Other Specific Comments

- 1-1 It is unclear from the discussion of Purpose of the Project just what the past present and future demand is for timber from the independent sale operators. Even if this is covered in the Forest Plan it should be explained for this project. To what extent is Etolin Island timber meeting this demand? Are there interested bidders? } 1
- 2-2 The No Action Alternative indicates that Etolin Island independent sale program would not be available in 1992. When would this area be considered again for harvest? What time period of no action would occur? The long term implications of the No Action Alternative needs to be explained. } 2
- 2-4 Regarding unit shaping some cutting units would be designed to imitate the shapes of natural slides or chutes. Any unit shaping that might increase landslide or water quality risks by choosing v-notch drainages should be avoided. } 3
- 2-19 How are corrections made of mistakes (feedback) made during implementation by the sale administrator? How are implementation monitoring results fed back into the planning process? } 4
- 2-19 More information is needed on effectiveness monitoring. What are the specific monitoring activities that are planned? See **monitoring** comments section. } 5
- 3-19 What is Level 3 stream survey data? How is it different from other levels? } 6
- 3-10 Existing fish habitat quality for each value comparison unit (VCU) is listed in the fifth column of Table 3.2. ADF&G Numbered Stream Data. What are the effects } 7

to habitat quality in each VCU for all the action alternatives? Effectiveness monitoring details should relate to this table.

- 3-37 This section discusses streambank and watershed sensitivity. Risks of v-notch failures in Class III and IV stream channels within units are not addressed. Attention is focussed primarily on stream banks of Class II and major Class II's. Yet, in Southeast Alaska failure of the small v-notch drainages within units is a recurrent problem. Such debris torrents may significantly affect the larger stream class waters with sediment and mobile large organic debris such as cull logs, stumps and logging slash. Further, maps presented in the draft EIS do not provide topographic detail to assess the hazards of these common landslide features within potential units. } 8
- 4-9 "Risk of indirect effects" to fisheries needs to be explained further. } 9
- 4-9 In order to gain a better understanding of absolute risk to fisheries the risk factors should be used with existing comparable watersheds that have been logged. Several reference points could be established. } 10
- 4-26 It is unclear from the discussion of cumulative effects what assumptions were made on the period of time over which the harvest would occur. What assumptions are made on time before re-entry? } 11
- 4-35 We support the use of existing Log Transfer Facilities wherever possible.

SUMMARY OF THE EPA RATING SYSTEM
FOR DRAFT ENVIRONMENTAL IMPACT STATEMENTS:
DEFINITIONS AND FOLLOW-UP ACTION *

Environmental Impact of the Action

LO--Lack of Objections

The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

EQ--Environmental Concerns

The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact. EPA intends to work with the lead agency to reduce these impacts.

EO--Environmental Objections

The EPA review has identified significant environmental impacts that should be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no-action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EU--Environmentally Unsatisfactory

The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potential unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the CEQ.

Adequacy of the Impact Statement

Category 1--Adequate

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category 2--Insufficient Information

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

Category 3--Inadequate

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

* From EPA Manual 1640 Policy and Procedures for the Review of Federal Actions Impacting the Environment

February, 1997

Letter from Ronald A. Lee, Environmental Protection Agency

- Comment 1:** What is the past, present and future demand for timber from the independent sale operators?
- Response 1:** See new Chapter 1, Purpose and Need of the Project.
- Comment 2:** The long term implications of the "no action" alternative need to be explained.
- Response 2:** The project area would be reconsidered almost immediately in a different configuration unless the "no action" alternative was selected for some unsolvable biological or political reasons (such as change of ownership.) The long term implication of a "no action" alternative would have serious implications on the ability of the Wrangell Ranger District to provide its share of the proposed timber program for the Tongass National Forest.
- Comment 3:** Any unit shaping that might increase landslide or water quality risks by choosing V-notch drainages should be avoided.
- Response 3:** We agree. This mitigation practice has been ongoing throughout the planning process through discussions between the landscape architect, wildlife biologist, soil and water specialists, and the logging engineer. Unit shaping and internal exclusions are designed with several factors in mind. Some of these factors include prevailing wind direction, windfirmness of the boundaries, risk of soil stability and water quality degradation, yarding capability, and proximity to wildlife habitat areas.
- Comment 4:** a) "How are corrections made during implementation?" b)"How are Implementation monitoring results fed back into the planning process."
- Response 4:** a) Corrections are made during the implementation phase by the sale administrator under the provisions in the particular timber sale contract. Minor adjustments can be made under Clause Minor changes. Larger changes can be made under modifications to the individual contract. In extreme cases a timber sale could be cancelled. Most changes are taken care of under minor changes. If there are serious environmental concerns, an Environmental Analysis is done before any change is done. Changes will also be made during sale layout based on ability to log, safety, and environmental concerns.
b) Monitoring results are fed back through the unit and road card system. There are presently 3 cards: 1) planning cards, 2) "As-laid-out" cards, and 3) monitoring unit cards. The third card evaluates past harvest activities. This card will also schedule the type of monitoring and provide the indicator for the effectiveness of the monitoring.
- Comment 5:** The monitoring section should be improved.
- Response 5:** Concur. Both the monitoring and mitigation discussions have been expanded.
- Comment 6:** "What is Level III stream survey data? How is it different from other levels?"

Response 6:

Level 3 is a field survey. It is designed to provide adequate baseline and summary information for management of unmanipulated habitats. It provides both measured and estimated information of individual parameters, as well as judgmental summaries on certain aspects of the stream environment. It attempts to answer questions about what fisheries habitat is present and the relative amounts of it. Level 4 is the basic survey for prescriptive planning of stream habitats. Level 5 is the implementation survey. It is the most intensive level of investigation of fisheries resources and provides information needed for project work to coordinate final site-specific prescriptions for resource uses.

Comment 7:

What are the effects to fish habitat quality in each VCU for all the action alternatives? Information should be included in Table 3-2.

Response 7:

Effects on habitat quality are expected to be minimal due to the designation of buffer strips adjacent fish habitat and the application of Best Management Practices (BMPs) to protect water quality. These prescriptions are applied consistently for all action alternatives. It is agreed that effectiveness monitoring should have non-degradation of habitat quality as one of its targets.

Comment 8:

Risks of V-notch failures in Class III and IV stream channels within units were not addressed in Chapter 3. Topographic maps would help assess the hazards of these common landslide features within potential units.

Response 8:

Thanks to your comment, an attempt has been made to clarify this part in the final EIS. See further discussion of this point in Response #6 to the letter from Peter Branson.

We do not believe maps providing topographic detail are a product to be incorporated in a NEPA planning document. Such microsite detail is usually obtained in on-the-ground reconnaissance and unit layout, and is often incorporated in the unit boundary delineation process. Regardless, it is doubtful that typical 15 minute USGS topo maps provide enough detail to show many of the higher risk slope and channel failure areas.

Comment 9:

"Risk of indirect effects to fisheries needs to be explained further."

Response 9:

"Risk of indirect effects" to fisheries has been removed from the text.

Comment 10:

"The fish factors should be used with existing comparable watersheds that have been logged."

Response 10:

Refer to reply to Open House comment #16.

Comment 11:

"It is unclear from the discussion of cumulative effects what assumptions were made on the period of time over which the harvest would occur. What assumptions are made on time before re-entry?"

Response 11:

Sales of this size usually are harvested over a period of 3-7 years, depending upon the operator and industry needs. Cumulative watershed effects (CWE) were analyzed for ground conditions as they now exist, and as they would exist after the completion of this sale. Additional CWE analyses will occur prior to any future harvest.

Appendix B

Unit Descriptions

APPENDIX B

UNIT DESCRIPTIONS

The following are the descriptions of the units proposed in the preferred alternative, Alternative 4. These descriptions are not "unit cards," but the results of the IDT analysis of those cards. The unit cards are part of the planning file and can be seen in that file. They will continue to be used through the layout and harvest of units and the survey and construction of roads described in the Forest Service Manual.

It has to be anticipated that there will be some minor changes to the units as depicted on these descriptions. Exact conformance to preset line, regardless of values, would not be proper management. Opportunities have to be anticipated and instituted not only to protect newly discovered situations, but also to optimize management intent without changing the environmental impacts. The resources, as they are now known and analyzed, have been protected or enhanced to the greatest extent practicable.

If changes and impacts develop which are outside the scope of the impacts envisioned in this Final EIS, additional documentation may be required.

Specific mitigation concerns, objectives, and mitigation measures are shown on the unit cards.

TIMBER SALE: STARFISH (ETOLIN) UNIT SUMMARY UNIT NUMBER: 401
 Management Area S23 VCU 464 Compartment 239 Stand 801 Acres: 79

UNIT DEVELOPMENT

The original unit as delineated on the Unit Field Recon Card dated 11/90 and presented on Alternative 4 (1/91) has been altered in design and decreased in size in order to mitigate visual, water quality, and wildlife habitat concerns while utilizing standing sawtimber and utility volume. These concerns and adjustments are described below.

UNIT ATTRIBUTES

Predominant Species: WH/SS mixed Age Class: OG 200+

Acres by Volume Class:

Volume Class 4 (8-20 mbf/acre)
79 Volume Class 5 (20-30 mbf/acre)
 Volume Class 6 (30-50 mbf/acre)
 Volume Class 7 (50+ mbf/acre)

Unit Volume:

2,694 mbf Net Saw Saw/Util
 Volume/Acre (net Sawlog): 29 mbf

Road Development: Specified Road Within Unit: .4 Miles; #'s 6272
 Spur Road Within Unit: .1 Miles
 Landings: 4

RESOURCE CONCERN (C), MANAGEMENT OBJECTIVES (O), AND MITIGATION DIRECTION (D)

Visuals

- C: Backline and ROW visible as middleground from Anita Bay and Zimovia Strait.
- O: Lessen the visual impact of the straight line unit boundary in the background. Unit appearance should not cause greater visual impact than the inventoried VQO of Partial Retention.
- D: Layout irregular "fingers" along backline and ROW. Exclude steep slopes in south corner. LA assist in layout.

Soil and Water Quality

- C: Channel and sideslope stability in setting 316, and slope stability on ridge/swale complex in 316.
- O: Minimize disturbance and maintain sideslope stability through suspension requirements.
- D: PROVIDE FULL SUSPENSION and secondary protection on the upslope reach of the channel below the road. PARTIAL SUSPENSION on slopes below road in setting 316 recommended (BMP 13.9).

Wildlife

- C: Extent of harvest reduces upland landbird habitat potential.
- O: Maintain some within stand diversity for wildlife habitat.
- D: Retain a small block (2-3 acres) along NE boundary of unit 401. Wildlife biologist assist in layout.

PROPOSED ACTION OR DEVELOPMENT

Stand will be planned for highlead and live skyline yarding with partial and full suspension required along the Class III stream in setting 316. Irregular "fingers" or internal exclusions along the unit boundaries will lessen the visual impact of the straight line unit boundary in the background and maintain some within stand diversity for wildlife habitat.

DESIRED FUTURE CONDITION

OBJ: Maximize wood fiber production while maintaining within stand diversity.
SITE PREP: none; REGEN: Natural; THIN: YEAR- ; SPACING- ; ROTATION: 100; I/D: none;
CONTROL: none; ENHAN: none; MONITORING: Year 3/5; CERT: 1997; OTHER COMMENTS: Monitor effectiveness of internal exclusions (leave areas) during reforestation reviews at year 3 and 5 post harvest. Note results of monitoring on Monitoring Card.



Approximate Drawing Scale:

1" = 660 feet (top of page is north)

Legend:

Planned Unit Boundary

Setting Boundary

Setting Number

Existing Road

Planned Spec. Road

Planned Temp. Road

Road Number

Permanent Bridge

Temporary Bridge

Landing

Existing Clearcut

Internal Exclusions

Helicopter Yarding (clearcut) *Hec*

Helicopter Yarding (group selection) *Heg*

Cable Yarding

Full Suspension

Partial Suspension

Watercourse

ARMU Stream Classification

ARMU Stream Classification boundary

Watercourse - CATEGORY B

Watercourse - CATEGORY C

Watercourse with 100-foot Buffer

TIMBER SALE: STARFISH (ETOLIN) UNIT SUMMARY UNIT NUMBER: 402
 Management Area S23 VCU 464 Compartment 239 Stand 802 Acres: 89

UNIT DEVELOPMENT

The original unit as delineated on the Unit Field Recon Card dated 11/90 and presented on Alternative 4 (1/91) has been reduced in size in order to mitigate visual, water quality, and wildlife habitat concerns while utilizing standing sawtimber and utility volume. These concerns and adjustments are described below.

UNIT ATTRIBUTES

Predominant Species: WH/SS mixed Age Class: OG 200+

Acres by Volume Class:

Unit Volume:

<u>89</u> Volume Class 4 (8-20 mbf/acre)	<u>2,215</u> mbf Net Saw	<u> </u> Saw/Util
<u> </u> Volume Class 5 (20-30 mbf/acre)	Volume/Acre (net Sawlog): <u>25</u> mbf	
<u> </u> Volume Class 6 (30-50 mbf/acre)		
<u> </u> Volume Class 7 (50+ mbf/acre)		

Road Development: Specified Road Within Unit: .5 Miles; #'s 6272
 Spur Road Within Unit: 0 Miles
 Landings: 4

RESOURCE CONCERN (C), MANAGEMENT OBJECTIVES (O), AND MITIGATION DIRECTION (D)

Visuals

- C: Upper portions of unit and ROW are visible as middleground from Anita Bay and as background from Zimovia Strait
- O: Unit appearance should not cause greater visual impact than the inventoried VQO of "modification".
- D: Screen ROW by retaining small block of standing timber immediately below and above road in setting 299 to the split line between 298 and 299. North (downslope) boundary of leave area along road must run parallel to the southernmost skyline span. Wildlife biologists assist in layout. Layout irregular "fingers" along backline. LA assist in layout.

Soil and Water Quality

- C: Bank stability on stream bisecting setting 299.
- O: Minimize bank, in-channel and sideslope disturbance.
- D: PROVIDE PARTIAL SUSPENSION across this channel (BMP 13.9) while utilizing 2 landings to yard perpendicular to channel (BMP 13.10). MAINTAIN PARTIAL SUSPENSION on slopes in setting 299, as marked on map (BMP 13.9).

Wildlife

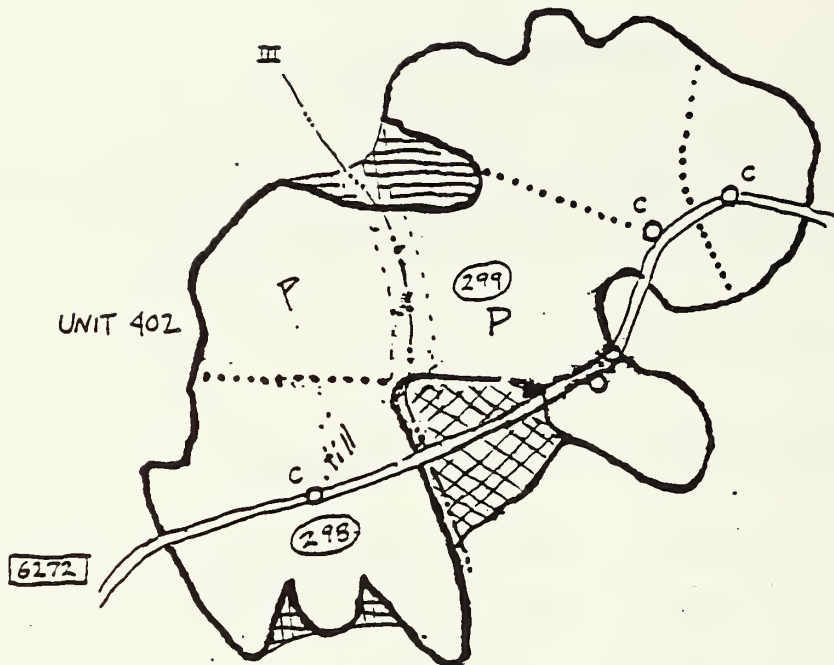
- C: Integrity of timbered habitat for furbearers and eagles between the unit and beach. Entire unit has upland landbird habitat potential and unit below the road has high value marten habitat.
- O: Maintain some within-stand diversity; minimize windthrow hazard to timber north of unit.
- D: Design boundaries to exclude approximately 4 acres in the form of a "finger" along the northern corner of setting 299. This is in addition to the blocks established for visual objectives and will further enhance wildlife habitat potential for upland landbirds.

PROPOSED ACTION OR DEVELOPMENT

Stand will be planned for highlead and live skyline yarding with partial suspension required across the Class III stream, in setting 299. Irregular "fingers" or internal exclusions along the unit boundaries will lessen the visual impact by breaking up the straight line unit boundary in the background and maintain some within-stand diversity for wildlife habitat.

DESIRED FUTURE CONDITION
















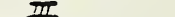

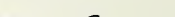



OBJ: Maximize wood fiber production while maintaining within stand diversity.
SITE PREP: none; REGEN: Natural; THIN: YEAR- ; SPACING- ; ROTATION: 100; I/D: none;
CONTROL: none; ENHAN: none; MONITORING: Year 3/5; CERT: 1997; OTHER COMMENTS: Monitor effectiveness of internal exclusions (leave areas) during reforestation reviews at year 3 and 5 post harvest. Note results of monitoring on Monitoring Card.



Approximate Drawing Scale:

1" = 660 feet (top of page is north)

Legend:

Planned Unit Boundary		Helicopter Yarding (clearcut)	<i>Hec</i>
Setting Boundary		Helicopter Yarding (group selection)	<i>Heg</i>
Setting Number		Cable Yarding	
Existing Road		Full Suspension	
Planned Spec. Road		Partial Suspension	
Planned Temp. Road		Watercourse	
Road Number		AHMU Stream Classification	
Permanent Bridge		AHMU Stream Classification boundary	
Temporary Bridge		Watercourse- CATEGORY B	
Landing		Watercourse- CATEGORY C	
Existing Clearcut		Watercourse with 100-foot Buffer	
Internal Exclusions			

TIMBER SALE: STARFISH (ETOLIN) UNIT SUMMARY UNIT NUMBER: 403
 Management Area S23 VCU 464 Compartment 239 Stand 803 Acres: 53

UNIT DEVELOPMENT

The original unit as delineated on the Unit Field Recon Card dated 11/90 and presented on Alternative 4 (1/91) has been altered in design and split into 2 separate cutting units in order to mitigate visual, water quality, and wildlife habitat concerns while utilizing standing sawtimber and utility volume. These concerns and adjustments are described below.

UNIT ATTRIBUTES

Predominant Species: WH/SS mixed Age Class: OG 200+

Acres by Volume Class:Unit Volume:

<u>53</u> Volume Class 4 (8-20 mbf/acre)	<u>1,396</u> mbf Net Saw	<u> </u> Saw/Util
<u> </u> Volume Class 5 (20-30 mbf/acre)	<u>Volume/Acre (net Sawlog):</u> <u>26</u> mbf	
<u> </u> Volume Class 6 (30-50 mbf/acre)		
<u> </u> Volume Class 7 (50+ mbf/acre)		

Road Development: Specified Road Within Unit: .44 Miles; #'s 6272
 Spur Road Within Unit: 0 Miles
 Landings: 4

RESOURCE CONCERN (C), MANAGEMENT OBJECTIVES (O), AND MITIGATION DIRECTION (D)Visuals

- C: Upper portions of unit are visible as middleground from Anita Bay and as background from Zimovia Strait.
- O: Unit appearance should not cause greater visual impact than the inventoried VQO of "modification".
- D: Incorporate irregular "finger" along backline in setting 294. Retain a 200-400 foot strip of timber between settings 294 and 295 to borrow from vertical landslide characteristics. LA assist in layout.

Soil and Water Quality

- C: Stability of channels bordering setting 293 and sideslope stability associated with V-notch just east of setting 295 boundary.
- O: Minimize V-notch, sideslope, and soil disturbance.
- D: PARTIAL SUSPENSION of logs across small alluvial fan area downslope of road in settings 293 and 293a. (BMP 13.9) and prevent the yarding of logs within streambanks (BMP 13.16). STREAMCOURSE PROTECTION (category B) would be required. Establish eastern boundary of setting 295 on the western side of V-notch 50 feet above the slope break.

Wildlife

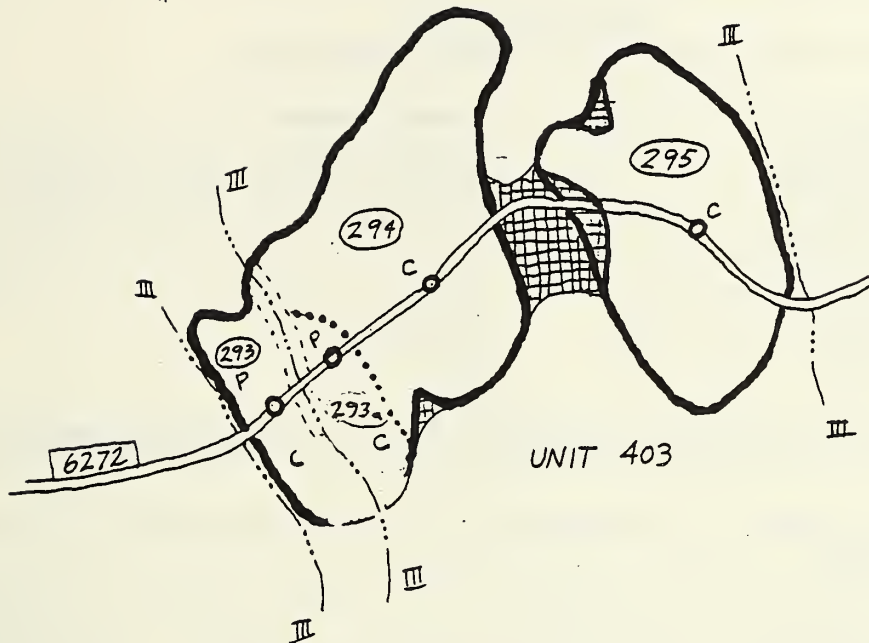
- C: Windfirmness of timbered habitat for furbearers and eagles between the unit and beach. Unit has upland landbird habitat potential.
- O: Maintain some within-stand diversity; minimize windthrow potential of timber to north of unit.
- D: The northern boundaries of the remaining beach-fringe habitat have a low probability of blowdown because the boundary is situated parrallel to the prevailing winds. Wildlife biologist assist in the layout.

PROPOSED ACTION OR DEVELOPMENT

Stand is planned for highlead and running skyline yarding. The creek between 293 and 293a must be a splitline. Setting 293a is intended to be a trackloader setting specifically designed to pull logs directly away from the streambank with good lift. Tail trees will likely be needed at the bottom of 293 to provide lift for partial suspension with running skyline. Irregular "fingers" and internal exclusions along the unit boundaries will lessen the visual impact by breaking up the straight line unit boundary in the background and maintain some within-stand diversity for wildlife habitat.

DESIRED FUTURE CONDITION

OBJ: Maximize wood fiber production while maintaining within stand diversity.
SITE PREP: none; REGEN: Natural; THIN: YEAR- ; SPACING- ; ROTATION: 100; I/D: none;
CONTROL: none; ENHAN: none; MONITORING: Year 3/5; CERT: 1997; OTHER COMMENTS: Monitor
effectiveness of internal exclusions (leave areas) during
reforestation reviews at year 3 and 5 post harvest. Note results of monitoring
on Monitoring Card.

UNIT NO. 403

Approximate Drawing Scale: 1" = 660 feet (top of page is north)

Legend:

Planned Unit Boundary		Helicopter Yarding (clearcut)	Hec
Setting Boundary		Helicopter Yarding (group selection)	Heg
Setting Number		Cable Yarding	C
Existing Road		Full Suspension	
Planned Spec. Road		Partial Suspension	
Planned Temp. Road		Watercourse	
Road Number		AHMu Stream Classification	III
Permanent Bridge		AHMu Stream Classification boundary	
Temporary Bridge		Watercourse-Primary Protection	
Landing		Watercourse-Secondary Protection	
Existing Clearcut	CC	Watercourse with 100-foot Buffer	
Internal Exclusions			

TIMBER SALE: STARFISH (ETOLIN) UNIT SUMMARY UNIT NUMBER: 404
 Management Area S23 VCU 464 Compartment 239 Stand 804 Acres: 25

UNIT DEVELOPMENT

The unit remains consistent with prior delineation on the Unit Field Recon Card dated 11/90 and as presented in Alternative 4 (1/91). Visual, water quality, and wildlife habitat concerns would be mitigated while standing sawtimber and utility volume would be utilized. These concerns are described below.

UNIT ATTRIBUTES

Predominant Species: WH/SS mixed Age Class: OG 200+

<u>Acres by Volume Class:</u>		<u>Unit Volume:</u>
<u>25</u> Volume Class 4 (8-20 mbf/acre)		<u>621 mbf Net Saw</u> <u>Saw/Util</u>
<u>25</u> Volume Class 5 (20-30 mbf/acre)		<u>Volume/Acre (net Sawlog): 25 mbf</u>
<u>25</u> Volume Class 6 (30-50 mbf/acre)		
<u>25</u> Volume Class 7 (50+ mbf/acre)		

Road Development: Specified Road Within Unit: .1 Miles; #'s 6272
 Spur Road Within Unit: .03 Miles
 Landings: 2

RESOURCE CONCERN (C), MANAGEMENT OBJECTIVES (O), AND MITIGATION DIRECTION (D)

Visuals

- C: The unit would be visible as middleground as seen from Anita Bay and as background from Zimovia Strait.
- O: Unit appearance should not cause greater visual impact than the inventoried VQO of "modification".
- D: Tie upper unit boundaries in with existing natural openings. Retain a small (1 acre or less) group of standing timber between spur and mainline in setting 291 to screen spur, if the spur proves to be needed. LA will assist in layout.

Soil and Water Quality

- C: Stability of channel on western boundary.
- O: Minimize disturbance to channel banks and sideslope.
- D: Utilize this channel as the boundary and prevent the introduction of debris into stream (BMP 13.16). PROVIDE SECONDARY PROTECTION.
- C: Slope stability near small unmappable channels and rills and on colluvial soils with thin organic layers.
- O: Minimize soil disturbance
- D: PARTIAL SUSPENSION RECOMMENDED downslope of road, (BMP 13.9).

Wildlife

- C: Windfirmness of terrestrial corridor connecting north and south Etolin Island.
- O: Maintain windfirmness of timber to west of unit.
- D: No additional mitigative measures have been incorporated. Unit boundaries are considered to have low-to-moderate blowdown potential.

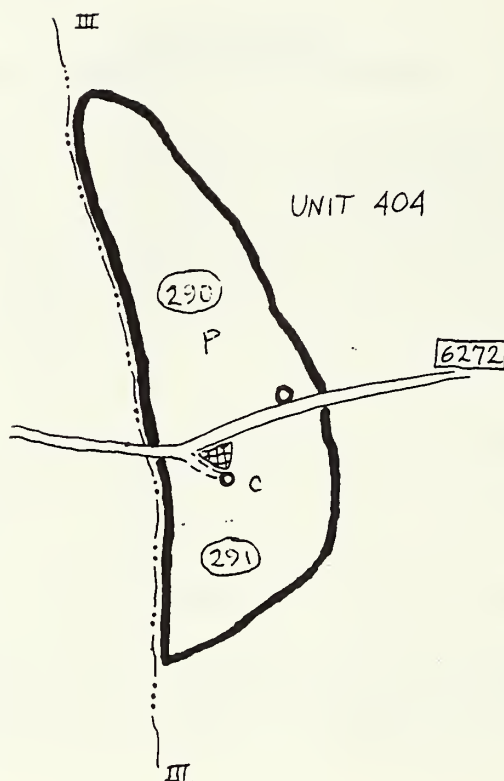
PROPOSED ACTION OR DEVELOPMENT

Setting 290 is planned to be yarded with a live or running skyline to reach the bottom of the long unit. This is tentative, depending on results of field profiles to be run during layout. It is expected that tail trees will be necessary. If a skyline is not feasible, the bottom boundary will be brought uphill to facilitate highlead yarding. A steep spur has been flagged up to a bench at the bottom of setting 291. During layout it may be found that this landing is not needed. If it is needed, a small 1 acre or less internal exclusion will be left between the specified and spur road in setting 291 to screen spur for visual concerns.





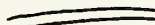







DESIRED FUTURE CONDITION

OBJ: Maximize wood fiber production while maintaining within stand diversity.
SITE PREP: none; REGEN: Natural; THIN: YEAR- ; SPACING- ; ROTATION: 100; I/D: none;
CONTROL: none; ENHAN: none; MONITORING: Year 3/5; CERT: 1997; OTHER COMMENTS: Monitor
effectiveness of internal exclusions (leave areas) during
reforestation reviews at year 3 and 5 post harvest. Note results of monitoring
on Monitoring Card.

UNIT NO. 404



Legend:

Planned Unit Boundary	
Setting Boundary	
Setting Number	
Existing Road	
Planned Spec. Road	
Planned Temp. Road	
Road Number	
Permanent Bridge	
Temporary Bridge	
Landing	
Existing Clearcut	
Internal Exclusions	

Helicopter Yarding (clearcut)	<i>Hec</i>
Helicopter Yarding (group selection)	<i>Heg</i>
Cable Yarding	<i>C</i>
Full Suspension	<i>F</i>
Partial Suspension	<i>P</i>
Watercourse	<i>-----</i>
AHMU Stream Classification	<i>III</i>
AHMU Stream Classification boundary	<i>[</i>
Watercourse-Primary Protection	<i>-----</i>
Watercourse-Secondary Protection	<i>-----</i>
Watercourse with 100-foot Buffer	<i>=====</i>

TIMBER SALE: STARFISH (ETOLIN) UNIT SUMMARY UNIT NUMBER: 405
 Management Area S23 VCU 464 Compartment 239 Stand 805 Acres: 94

UNIT DEVELOPMENT

The original unit as delineated on the Unit Field Recon Card (11/90) consisted of settings 232, 233, and 234. Setting 234 has been dropped and settings 230 and 231 added. This unit as presented in Alternative 4 (1/91) has been further altered in design and reduced in size. Visual, water quality, and wildlife habitat concerns would be mitigated while standing sawtimber and utility volume would be utilized. These concerns are described below.

UNIT ATTRIBUTES

Predominant Species: WH/SS mixed Age Class: OG 200+

Acres by Volume Class:

Volume Class 4 (8-20 mbf/acre)

94 Volume Class 5 (20-30 mbf/acre)

Volume Class 6 (30-50 mbf/acre)

Volume Class 7 (50+ mbf/acre)

Unit Volume:

2.345 mbf Net Saw Saw/Util

Volume/Acre (net Sawlog): 25 mbf

Road Development: Specified Road Within Unit: 0 Miles; #'s _____
 Spur Road Within Unit: .6 Miles
 Landings: 5

RESOURCE CONCERN (C), MANAGEMENT OBJECTIVES (O), AND MITIGATION DIRECTION (D)

Fisheries

- C: Class I streamcourses downstream of unit.
 O: Protection fish habitat.
 D: Flag northern boundary as least 100' upstream of Class I habitat as shown on map. Establish Class III channels as splitlines and PROVIDE SECONDARY PROTECTION. Drop finger portions along northeastern boundaries. Fisheries biologist assist in layout.

Visuals

- C: The unit would be visible as middleground as seen from Anita Bay and Burnett Inlet with low VAC.
 O: Unit appearance should not cause greater visual impact than the inventoried VQO of "modification".
 D: Incorporate irregularly-shaped "fingers" along unit boundary. LA assist in layout.

Water Quality

- C: Water quality upstream of two Class I streams.
 O: Maintain bank stability.
 D: Splitline yarding on Class III streams as mapped.

Wildlife

- C: Cumulative impacts of harvest within vicinity on upland landbirds and cavity nesting birds. Most of the unit has high value marten habitat.
- O: Maintain within-stand diversity for wildlife habitat quality.
- D: Concerns for landbirds have been mitigated with the deletion of northeastern portions and addition of fingers along unit boundary. Wildlife biologist assist in layout. Can't mitigate loss of marten habitat.

PROPOSED ACTION OR DEVELOPMENT

Stand will be planned for highlead yarding. Split line yarding on mapped Class III streams. Irregular "fingers" incorporated along unit boundary.

DESIRED FUTURE CONDITION

OBJ: Maximize wood fiber production while maintaining within stand diversity.

SITE PREP: none; REGEN: Natural; THIN: YEAR- ; SPACING- ; ROTATION: 100; I/D: none;

CONTROL: none; ENHAN: none; MONITORING: Year 3/5; CERT: 1997; OTHER COMMENTS: Monitor

effectiveness of internal exclusions (leave areas) during
reforestation reviews at year 3 and 5 post harvest. Note results of monitoring
on Monitoring Card.

TIMBER SALE: STARFISH (ETOLIN) UNIT SUMMARY UNIT NUMBER: 406
 Management Area S23 VCU 464 Compartment 239 Stand 806 Acres: 39

UNIT DEVELOPMENT

The original unit as delineated on the Unit Field Recon Card (11/90) consisted of settings 113, 114, 115, 116, and 117. Setting 116 and 117 have been dropped after field recon on 4/91 verified oversteepened slopes. Visual, water quality, and wildlife habitat concerns would be mitigated while standing sawtimber and utility volume would be utilized. These concerns are described below.

UNIT ATTRIBUTES

Predominant Species: WH/SS mixed Age Class: OG 200+

Acres by Volume Class:Unit Volume:

<u>39</u> Volume Class 4 (8-20 mbf/acre)	<u>Net Saw</u>	<u>Saw/Util</u>
<u> </u> Volume Class 5 (20-30 mbf/acre)	<u>Volume/Acre (net Sawlog):</u>	<u>25 mbf</u>
<u> </u> Volume Class 6 (30-50 mbf/acre)		
<u> </u> Volume Class 7 (50+ mbf/acre)		

Road Development: Specified Road Within Unit: .2 Miles; #'s 51402
 Spur Road Within Unit: 0 Miles
 Landings: 3

RESOURCE CONCERN (C), MANAGEMENT OBJECTIVES (O), AND MITIGATION DIRECTION (D)Fisheries/Water Quality

- C: Bank/sideslopes stability of Class III streams in setting 113 and between settings 114 and 115.
- O: Protect fish habitat.
- D: PROVIDE FULL SUSPENSION over Class III channel in setting 113 (BMP 13.9) Maintain Class III channel for splitline between settings 114 and 115 IMPLEMENTING SECONDARY ORITECTION (BMP 13.16).

Visuals

- C: The unit would be visible as middleground from Anita Bay. Northwestern corner will create a geometrical line.
- O: Unit appearance whould not cause greater visual impact than the inventoried VQO of "modification".
- D: Incorporate irregularly-shaped "fingers" along unit boundary, constrict backline in setting 114 and tie northwestern corner in gradually with existing Granite Unit 5. LA assist in layout.

Wildlife

- C: Cumulative impacts of harvest within vicinity on upland landbirds and cavity nesting birds. Unit has high value marten habitat.
- O: Maintain within-stand diversity for wildlife habitat quality.
- D: Concerns for upland birds will be mitigated with the implementation of visual recommendations. Can't mitigate loss of marten habitat.

PROPOSED ACTION OR DEVELOPMENT

Settings 114 and 115 are planned for highlead yarding. Split line yarding on the Class III stream between settings 114 and 115. Setting 113 is planned for running skyline yarding, with full suspension over the Class III stream. Irregular "fingers" incorporated along unit boundary.

DESIRED FUTURE CONDITION

OBJ: Maximize wood fiber production while maintaining within stand diversity.
SITE PREP: none; REGEN: Natural; THIN: YEAR- ; SPACING- ; ROTATION: 100; I/D: none;
CONTROL: none; ENHAN: none; MONITORING: Year 3/5; CERT: 1997; OTHER COMMENTS: Monitor
effectiveness of internal exclusions (leave areas) during
reforestation reviews at year 3 and 5 post harvest. Note results of monitoring
on Monitoring Card.



TIMBER SALE: STARFISH (ETOLIN) UNIT SUMMARY UNIT NUMBER: 407
 Management Area S23 VCU 464 Compartment 239 Stand 807 Acres: 48

UNIT DEVELOPMENT

The original unit as delineated on the Unit Field Recon Card (7/90) and as presented in Alternative 4 (1/91) has carried through to this point with no adjustments in design. The harvest of standing sawtimber and utility volume is expected to have no significant impacts on the forest ecosystem.

UNIT ATTRIBUTES

Predominant Species: WH/SS mixed Age Class: OG 200+

Acres by Volume Class:

Volume Class 4 (8-20 mbf/acre)

Volume Class 5 (20-30 mbf/acre)

48 Volume Class 6 (30-50 mbf/acre)

Volume Class 7 (50+ mbf/acre)

Unit Volume:

1,444 mbf Net Saw Saw/Util

Volume/Acre (net Sawlog): 23 mbf

Road Development: Specified Road Within Unit: .1 Miles; #'s 51540
 Spur Road Within Unit: .45 Miles
 Landings: 4

RESOURCE CONCERN (C), MANAGEMENT OBJECTIVES (O), AND MITIGATION DIRECTION (D)

Timber

- C: Blowdown potential throughout the drainage.
- O: Minimize the blowdown hazard after timber harvesting.
- D: On the first entry into the drainage, initial harvesting to begin at the head of the drainage.

PROPOSED ACTION OR DEVELOPMENT

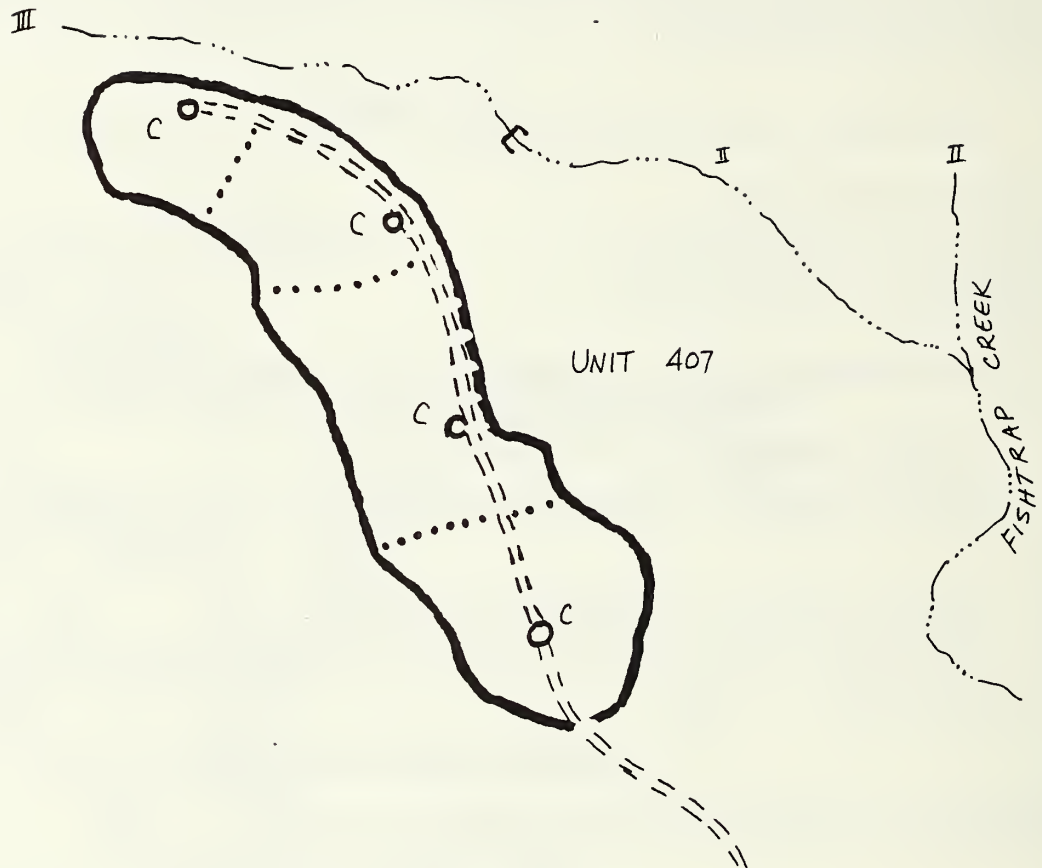
Stand will be planned primarily for highlead yarding.

DESIRED FUTURE CONDITION

OBJ: Maximize wood fiber production while maintaining within stand diversity.




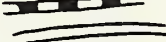
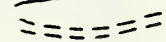
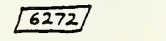






SITE PREP: none; REGEN: Natural; THIN: YEAR- ; SPACING- ; ROTATION: 100; I/D: none;






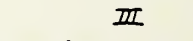


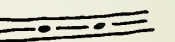
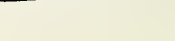
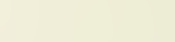
CONTROL: none; ENHAN: none; MONITORING: Year 3/5; CERT: 1997; OTHER COMMENTS: Reforestation reviews at year 3 and 5 post harvest.

UNIT NO. 407

Approximate Drawing Scale: 1" = 660 feet (top of page is north)

Legend:

Planned Unit Boundary 
 Setting Boundary 
 Setting Number 
 Existing Road 
 Planned Spec. Road 
 Planned Temp. Road 
 Road Number 
 Permanent Bridge 
 Temporary Bridge 
 Landing 
 Existing Clearcut 
 Internal Exclusions 

Helicopter Yarding (clearcut) 
 Helicopter Yarding (group selection) 
 Cable Yarding 
 Full Suspension 
 Partial Suspension 
 Watercourse 
 AHMU Stream Classification 
 AHMU Stream Classification boundary 
 Watercourse-Primary Protection 
 Watercourse-Secondary Protection 
 Watercourse with 100-foot Buffer 

TIMBER SALE: STARFISH (ETOLIN) UNIT SUMMARY UNIT NUMBER: 408
 Management Area S23 VCU 464 Compartment 239 Stand 808 Acres: 31

UNIT DEVELOPMENT

The original unit as delineated on the Unit Field Recon Card (11/90) and as presented in Alternative 4 (1/91) consists of 2 settings 108, 109, within a contiguous harvest unit of 5 settings (including 3 settings of unit 409). Unit 408 has been separated now by the deletion of a portion of setting 110 in unit 409. The boundaries for unit 408, however have not been adjusted. The following fisheries, water quality, and wildlife concerns would be mitigated while standing sawtimber and utility volume would be utilized.

UNIT ATTRIBUTES

Predominant Species: WH/SS mixed Age Class: OG 200+

Acres by Volume Class:

31 Volume Class 4 (8-20 mbf/acre)

31 Volume Class 5 (20-30 mbf/acre)

31 Volume Class 6 (30-50 mbf/acre)

31 Volume Class 7 (50+ mbf/acre)

Unit Volume:

932 mbf Net Saw 30 Saw/Util

Volume/Acre (net Sawlog): 30 mbf

Road Development: Specified Road Within Unit: 0 Miles; #'s
 Spur Road Within Unit: .3 Miles
 Landings: 2

RESOURCE CONCERN (C), MANAGEMENT OBJECTIVES (O), AND MITIGATION DIRECTION (D)Fisheries/Water Quality

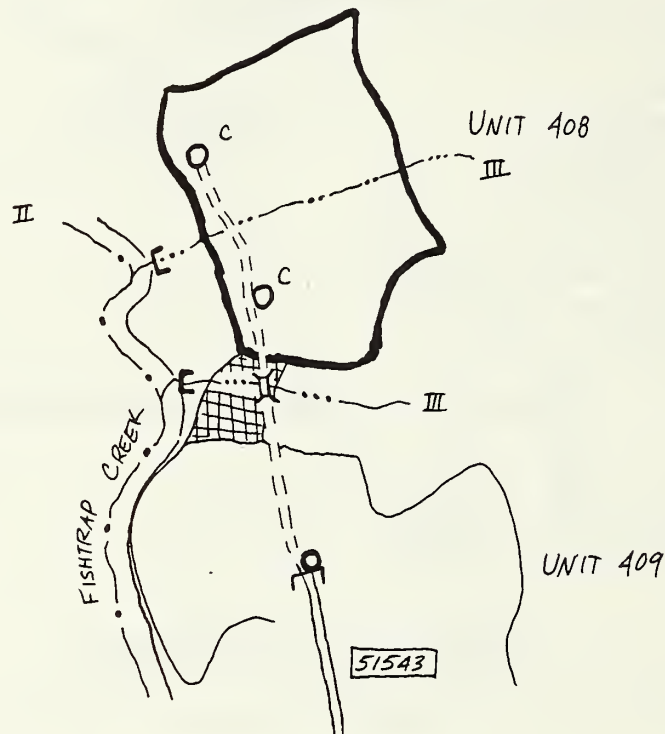
- C: Bank integrity of small stream bisecting Unit.
 O: Maintain bank stability.
 D: Utilize this channel as a splitline (BMP 13.16).

PROPOSED ACTION OR DEVELOPMENT

Stand will be planned primarily for highlead yarding. Use Class III channel as splitline between settings.

DESIRED FUTURE CONDITION

OBJ: Maximize wood fiber production while maintaining within stand diversity.
 SITE PREP: none; REGEN: Natural; THIN: YEAR- ; SPACING- ; ROTATION: 100; I/D: none;
 CONTROL: none; ENHAN: none; MONITORING: Year 3/5; CERT: 1997; OTHER COMMENTS: Monitor effectiveness of leave area during reforestation reviews at year 3 and 5 post harvest.
Note results of monitoring on Monitoring Card.

UNIT NO. 408

Approximate Drawing Scale: 1" = 660 feet (top of page is north)

Legend:

Planned Unit Boundary		Helicopter Yarding (clearcut)	<i>Hec</i>
Setting Boundary		Helicopter Yarding (group selection)	<i>Heg</i>
Setting Number		Cable Yarding	<i>C</i>
Existing Road		Full Suspension	
Planned Spec. Road		Partial Suspension	
Planned Temp. Road		Watercourse	
Road Number		AHMu Stream Classification	<i>III</i>
Permanent Bridge		AHMu Stream Classification boundary	
Temporary Bridge		Watercourse-Primary Protection	
Landing		Watercourse-Secondary Protection	
Existing Clearcut	<i>CC</i>	Watercourse with 100-foot Buffer	
Internal Exclusions			

TIMBER SALE: STARFISH (ETOLIN) UNIT SUMMARY UNIT NUMBER: 409
 Management Area S23 VCU 464 Compartment 239 Stand 809 Acres: 87

UNIT DEVELOPMENT

The original unit as delineated on the Unit Field Recon Card (11/90) and as presented in Alternative 4 (1/91) consists of 3 settings 110, 112, and 112 within a contiguous harvest unit of 5 settings (including 2 settings of unit 408). Unit 409 has been separated now by the deletion of a portion of setting 110. The following fisheries, water quality, and wildlife concerns would be mitigated while standing sawtimber and utility volume would be utilized.

UNIT ATTRIBUTES

Predominant Species: WH/SS mixed Age Class: OG 200+

Acres by Volume Class:

 Volume Class 4 (8-20 mbf/acre)
 Volume Class 5 (20-30 mbf/acre)
87 Volume Class 6 (30-50 mbf/acre)
 Volume Class 7 (50+ mbf/acre)

Unit Volume:

3,276 mbf Net Saw Saw/Util
 Volume/Acre (net Sawlog): 38 mbf

Road Development: Specified Road Within Unit: .33 Miles; #'s 51543
 Spur Road Within Unit: .1 Miles
 Landings: 3

RESOURCE CONCERN (C), MANAGEMENT OBJECTIVES (O), AND MITIGATION DIRECTION (D)

Fisheries

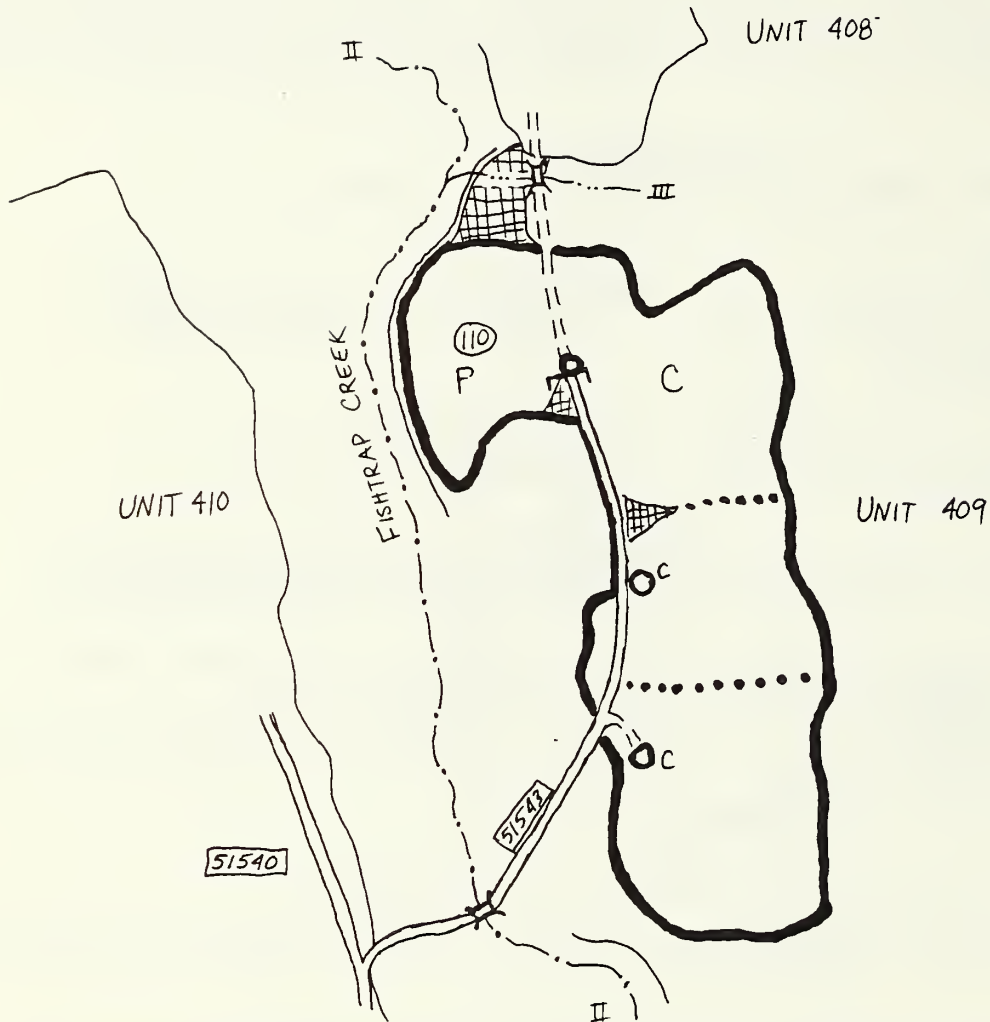
- C: Riparian protection along Fishtrap Creek in proximity to the western boundary of setting 110 and channel stability of all tributaries in the Unit.
- O: Protect fish habitat.
- D: Maintain 100-foot buffer along any AHMU Class II reaches and utilize tributaries as splitlines (BMP'S 12.6 & 13.16)

Water and Soil Quality

- C: Riparian protection and alluvial fan stability in setting 110.
- O:
- D: Maintain 100-foot buffer along Class II reach. Partial suspension on alluvial soils is recommended. (BMP 13.9)






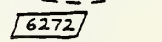






Wildlife






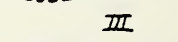


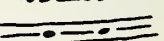

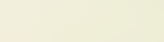
- C: North end of unit below road has high value deer winter range and otter habitat. Most of unit has high value marten habitat.
- O:
- D: Not possible to mitigate and still log unit.

UNIT NO. 409

Approximate Drawing Scale: 1" = 660 feet (top of page is north)

Legend:

Planned Unit Boundary 
 Setting Boundary 
 Setting Number 
 Existing Road 
 Planned Spec. Road 
 Planned Temp. Road 
 Road Number 
 Permanent Bridge 
 Temporary Bridge 
 Landing 
 Existing Clearcut 
 Internal Exclusions 

Helicopter Yarding (clearcut) 
 Helicopter Yarding (group selection) 
 Cable Yarding 
 Full Suspension 
 Partial Suspension 
 Watercourse 
 AHMU Stream Classification 
 AHMU Stream Classification boundary 
 Watercourse-Primary Protection 
 Watercourse-Secondary Protection 
 Watercourse with 100-foot Buffer 

PROPOSED ACTION OR DEVELOPMENT

Stand will be planned for highlead yarding and running skyline. Tail trees will be needed to provide lift for partial suspension below the road in setting 110. Maintain 100-foot buffer along Class II stream along western boundary of setting 110. Retain the internal exclusions identified for within stand diversity.

DESIRED FUTURE CONDITION

OBJ: Maximize wood fiber production while maintaining within stand diversity.
SITE PREP: none; REGEN: Natural; THIN: YEAR- ; SPACING- ; ROTATION: 100; I/D: none;
CONTROL: none; ENHAN: none; MONITORING: Year 3/5; CERT: 1997; OTHER COMMENTS: Monitor
effectiveness of leave area during reforestation reviews at year 3 and 5 post harvest.
Note results of monitoring on Monitoring Card.

TIMBER SALE: STARFISH (ETOLIN) UNIT SUMMARY UNIT NUMBER: 410
 Management Area S23 VCU 464 Compartment 239 Stand 810 Acres: 110

UNIT DEVELOPMENT

The original unit as delineated on the Unit Field Recon Card (11/90) and as presented in Alternative 4 (1/91) consists of 6 settings 101, 100, 99, 98, 97 and 96, has been carried through to this point with no design changes. The following fisheries, water quality, and wildlife concerns would be mitigated while standing sawtimber and utility volume would be utilized.

UNIT ATTRIBUTES

Predominant Species: WH/SS mixed Age Class: OG 200+

Acres by Volume Class:

Unit Volume:

<u>18</u> Volume Class 4 (8-20 mbf/acre)	<u>2,455</u> mbf Net Saw	<u> </u> Saw/Util
<u>92</u> Volume Class 5 (20-30 mbf/acre)	Volume/Acre (net Sawlog):	<u>22</u> mbf
<u> </u> Volume Class 6 (30-50 mbf/acre)		
<u> </u> Volume Class 7 (50+ mbf/acre)		

Road Development: Specified Road Within Unit: .7 Miles; #'s 51540
 Spur Road Within Unit: 0 Miles
 Landings: 6

RESOURCE CONCERN (C), MANAGEMENT OBJECTIVES (O), AND MITIGATION DIRECTION (D)

Fisheries/Water Quality

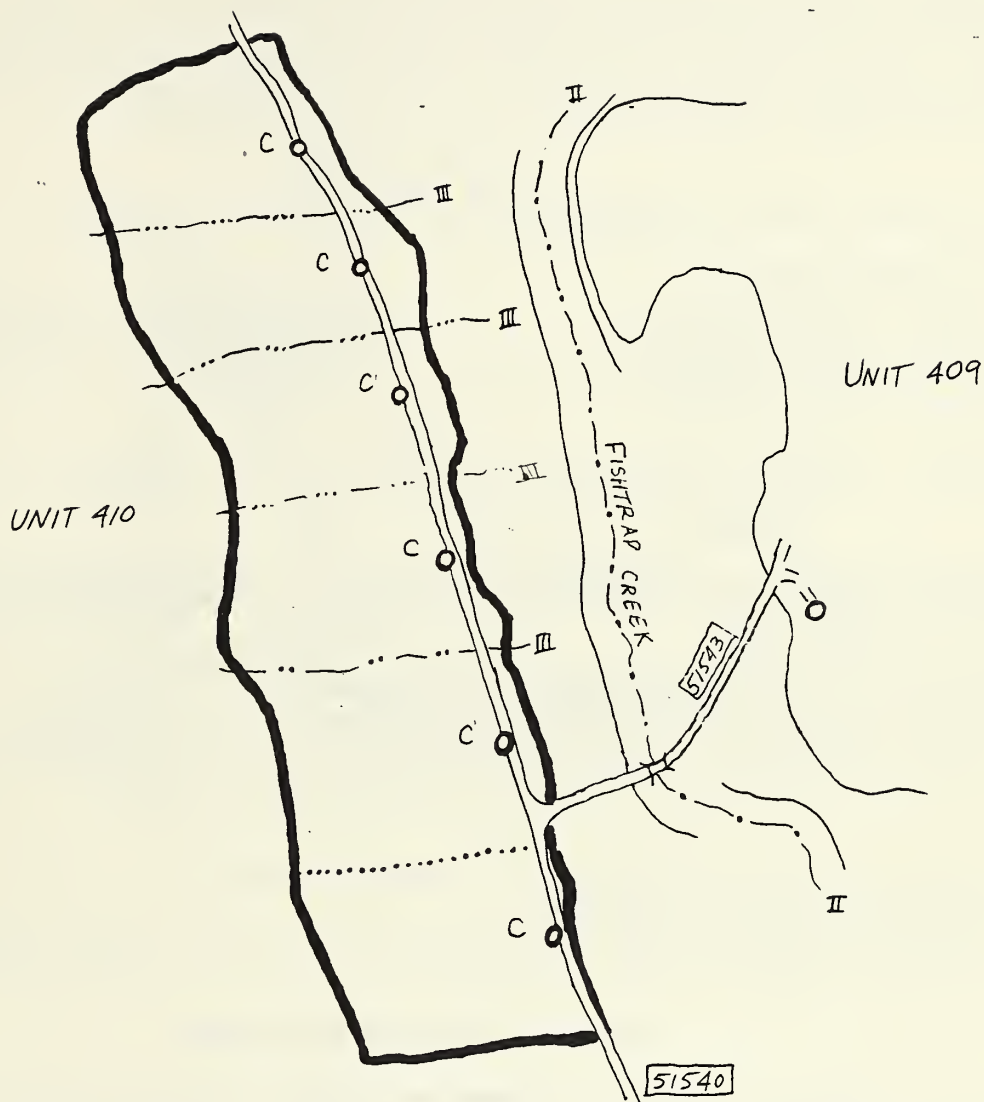
- C: Stability of tributary channels throughout Unit.
- O: Minimize bank disturbance.
- D: Utilize those 3-5 small channels that cross the muskeg "buffer" below as splitlines (BMP 13.16). Provide SECONDARY PROTECTION for Class III stream in southern half of unit. (See attached map.)

PROPOSED ACTION OR DEVELOPMENT

Stand will be planned primarily for highlead yarding. Use the Class III stream channels as splitlines. A few of these Class III channels are extremely small. Actual use of these channels as splitlines is left to the discretion of the layout forester. The largest of the channels is noted on the map to require secondary protection.

DESIRED FUTURE CONDITION

OBJ: Maximize wood fiber production while maintaining within stand diversity.
 SITE PREP: none; REGEN: Natural; THIN: YEAR- ; SPACING- ; ROTATION: 100; I/D: none;
 CONTROL: none; ENHAN: none; MONITORING: Year 3/5; CERT: 1997; OTHER COMMENTS: Reforestation
reviews at year 3 and 5 post harvest.

UNIT NO. 410

Approximate Drawing Scale:

1" = 660 feet (top of page is north)

Legend:

Planned Unit Boundary	
Setting Boundary	
Setting Number	
Existing Road	
Planned Spec. Road	
Planned Temp. Road	
Road Number	
Permanent Bridge	
Temporary Bridge	
Landing	
Existing Clearcut	
Internal Exclusions	

Helicopter Yarding (clearcut)	
Helicopter Yarding (group selection)	
Cable Yarding	
Full Suspension	
Partial Suspension	
Watercourse	
AHMu Stream Classification	
AHMu Stream Classification boundary	
Watercourse-Primary Protection	
Watercourse-Secondary Protection	
Watercourse with 100-foot Buffer	

TIMBER SALE: STARFISH (ETOLIN) UNIT SUMMARY UNIT NUMBER: 411
 Management Area S23 VCU 464 Compartment 239 Stand 811 Acres: 38

UNIT DEVELOPMENT

The original unit as delineated on the Unit Field Recon Card (11/90) and as presented in Alternative 4 (1/91) has been altered in design and reduced in size. The following fisheries, water quality, and wildlife concerns would be mitigated while standing sawtimber and utility volume would be utilized. Unit was placed against scrubby timber to the west to minimize blowdown potential from east and southeast winds.

UNIT ATTRIBUTES

Predominant Species: WH/SS mixed Age Class: OG 200+

Acres by Volume Class:

Unit Volume:

<u>38</u> Volume Class 4 (8-20 mbf/acre)	957 mbf Net Saw	Saw/Util
Volume Class 5 (20-30 mbf/acre)	Volume/Acre (net Sawlog): <u>25</u> mbf	
Volume Class 6 (30-50 mbf/acre)		
Volume Class 7 (50+ mbf/acre)		

Road Development: Specified Road Within Unit: .5 Miles; #'s 51540
 Spur Road Within Unit: .1 Miles
 Landings: 3

RESOURCE CONCERN (C), MANAGEMENT OBJECTIVES (O), AND MITIGATION DIRECTION (D)

Fisheries/Water Quality

- C: Stability of tributary channels throughout Unit.
- O: Maintain channel stability and water quality.
- D: Utilize tributaries as splitlines (BMP 13.16) and exclude portion between tribs in upper end of Unit (4 acres). Hydrologist assist in layout.

Wildlife

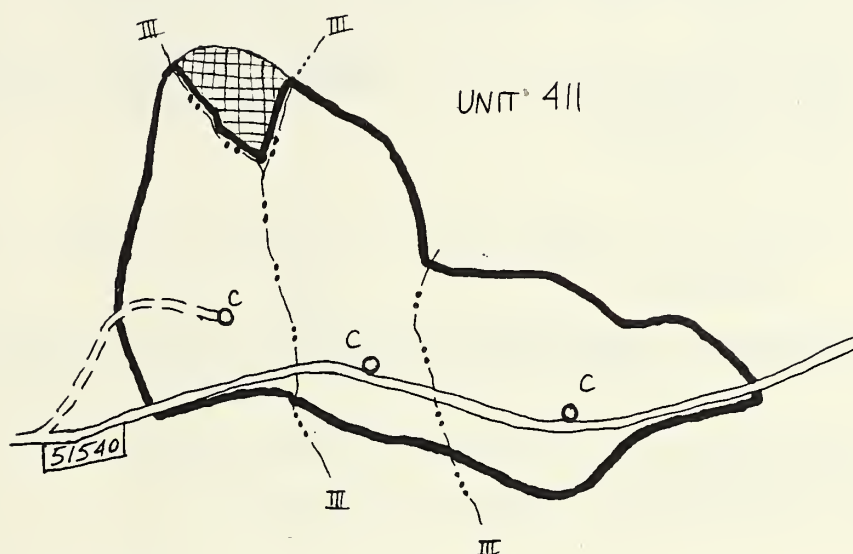
- C: Decrease in structural diversity following harvest
- O: Maintain structural diversity.
- D: Internal Exclusion along northwest portion of unit boundary mitigates this concern. Wildlife biologist assist in layout.

PROPOSED ACTION OR DEVELOPMENT

Stand will be planned primarily for highlead yarding. Use the Class III stream channels as splitlines. Irregular "fingers" incorporated along the unit boundary.

DESIRED FUTURE CONDITION

OBJ: Maximize wood fiber production while maintaining within stand diversity.
 SITE PREP: none; REGEN: Natural; THIN: YEAR- ; SPACING- ; ROTATION: 100; I/D: none;
 CONTROL: none; ENHAN: none; MONITORING: Year 3/5; CERT: 1997; OTHER COMMENTS: Monitor effectiveness of internal exclusions (leave areas) during reforestation reviews at year 3 and 5 post harvest. Note results of monitoring on Monitoring Card.

UNIT NO. 411

Approximate Drawing Scale: 1" = 660 feet (top of page is north)

Legend:

Planned Unit Boundary
 Setting Boundary
 Setting Number
 Existing Road
 Planned Spec. Road
 Planned Temp. Road
 Road Number
 Permanent Bridge
 Temporary Bridge
 Landing
 Existing Clearcut
 Internal Exclusions

Helicopter Yarding (clearcut)
 Helicopter Yarding (group selection)
 Cable Yarding
 Full Suspension
 Partial Suspension
 Watercourse
 AHMU Stream Classification
 AHMU Stream Classification boundary
 Watercourse-Primary Protection
 Watercourse-Secondary Protection
 Watercourse with 100-foot Buffer

TIMBER SALE: STARFISH (ETOLIN) UNIT SUMMARY UNIT NUMBER: 412
 Management Area S23 VCU 467 Compartment 244 Stand 812 Acres: 65

UNIT DEVELOPMENT

The original unit as delineated on the Unit Field Recon Card (11/90) and as presented in Alternative 4 (1/91) has been altered in design and reduced in size. The following fisheries, water quality, and wildlife concerns would be mitigated while standing sawtimber and utility volume would be utilized. Unit was placed at the northwest end of the stand to avoid windthrow from southeast winds, the cause of existing blowdown near the southeast boundary.

UNIT ATTRIBUTES

Predominant Species: WH/SS mixed Age Class: OG 200+

Acres by Volume Class:

Unit Volume:

<u>65</u> Volume Class 4 (8-20 mbf/acre)	1,637 mbf Net Saw	Saw/Util
Volume Class 5 (20-30 mbf/acre)	Volume/Acre (net Sawlog): <u>25 mbf</u>	
Volume Class 6 (30-50 mbf/acre)		
Volume Class 7 (50+ mbf/acre)		

Road Development: Specified Road Within Unit: .4 Miles; #'s 51541
 Spur Road Within Unit: 0 Miles
 Landings: 4

RESOURCE CONCERN (C), MANAGEMENT OBJECTIVES (O), AND MITIGATION DIRECTION (D)

Fisheries

- C: Riparian protection of Pump Creek (AHMU Class II stream).
- O: Protect fish habitat.
- D: Establish minimum 100-foot buffer in setting 61.

Wildlife

- C: Decrease in structural diversity following harvest
- O: Maintain structural diversity.
- D: Retain small island of timber (internal exclusion) along splitline between settings 60b and 61b. Visual alterations further satisfy this concern. Wildlife biologist assist in layout.

Visuals

- C: The unit would be visible from Mosman Inlet as Background.
- O: Unit appearance should not cause greater visual impact than the inventoried VQO of "modification".
- D: Eliminate geometric pattern by modifying setting 63 as shown on unit description map. Incorporate this change only if it is determined that the volume in this corner can be captured at next entry. LA assist layout to include small irregular "fingers" along unit boundary in setting 62.

Soils

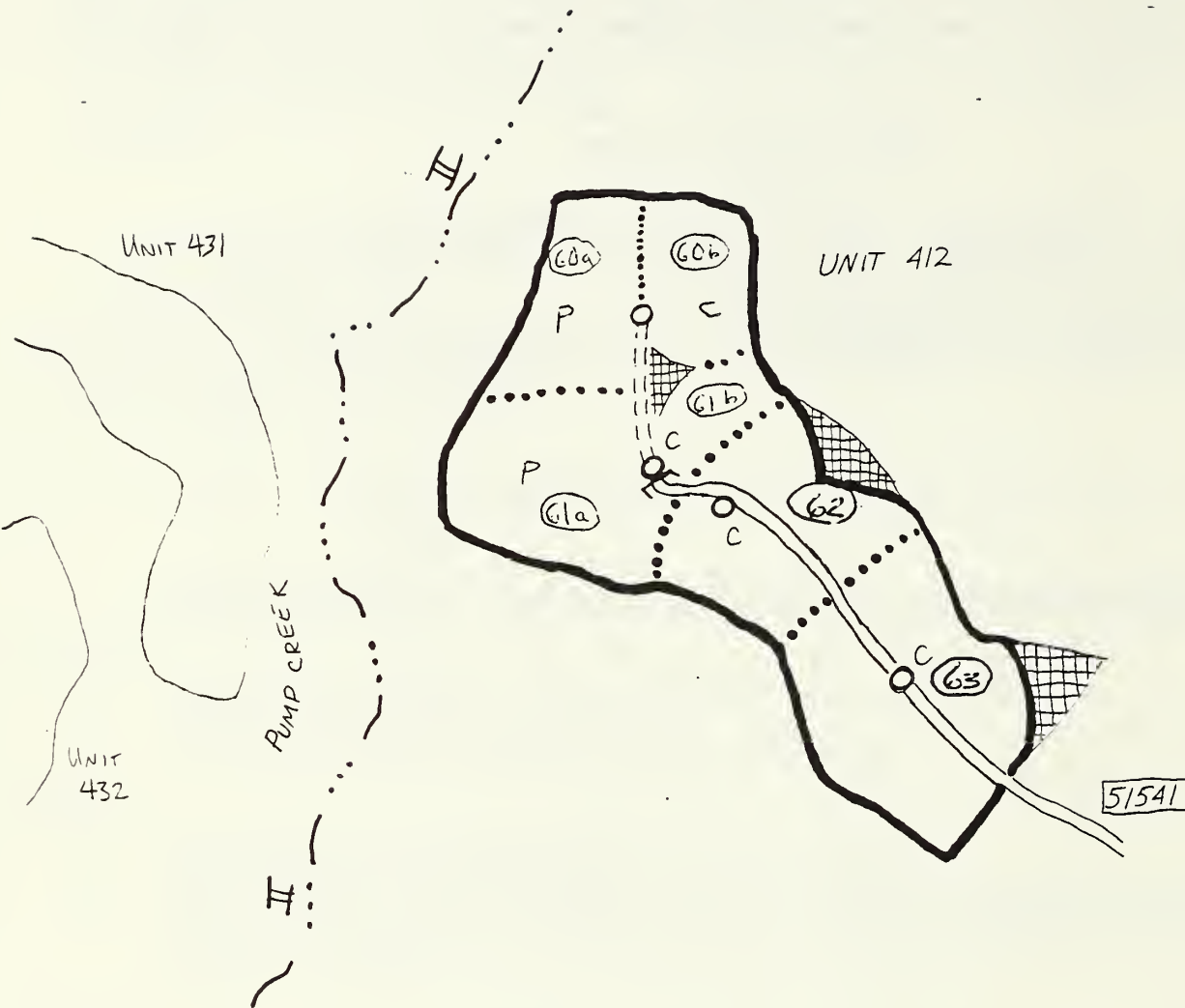
- C: Slope stability of 60a and 61a.
- O: Minimize mineral soil disturbance on steep slopes above Pump Creek.
- D: Assure landing locations and yarding capability on the slope above Pump Creek. Prevent "blind leads" and allow at least PARTIAL SUSPENSION of logs over the slope break (BMP's 13.9 and 13.10).

PROPOSED ACTION OR DEVELOPMENT

Stand will be planned for highlead yarding in settings 60b, 61b, 62, and 63, and settings 60a and 61a will be harvested using a live or running skyline. Partial suspension will be required in settings 60a and 61a. Irregular "fingers" incorporated along the unit boundary and an internal exclusion is incorporated east of road along splitline between setting 60 and 61.

DESIRED FUTURE CONDITION

OBJ: Maximize wood fiber production while maintaining within stand diversity.
SITE PREP: none; REGEN: Natural; THIN: YEAR- ; SPACING- ; ROTATION: 100; I/D: none;
CONTROL: none; ENHAN: none; MONITORING: Year 3/5; CERT: 1997; OTHER COMMENTS: Monitor
effectiveness of internal exclusions (leave areas) during
reforestation reviews at year 3 and 5 post harvest. Note results of monitoring
on Monitoring Card.

UNIT NO. 412

Approximate Drawing Scale:

1" = 660 feet (top of page is north)

Legend:

Planned Unit Boundary
 Setting Boundary
 Setting Number
 Existing Road
 Planned Spec. Road
 Planned Temp. Road
 Road Number
 Permanent Bridge
 Temporary Bridge
 Landing
 Existing Clearcut
 Internal Exclusions

Helicopter Yarding (clearcut)
 Helicopter Yarding (group selection)
 Cable Yarding
 Full Suspension
 Partial Suspension
 Watercourse
 AHMU Stream Classification
 AHMU Stream Classification boundary
 Watercourse-Primary Protection
 Watercourse-Secondary Protection
 Watercourse with 100-foot Buffer

TIMBER SALE: STARFISH (ETOLIN) UNIT SUMMARY UNIT NUMBER: 413
 Management Area S23 VCU 464 Compartment 239 Stand 813 Acres: 17

UNIT DEVELOPMENT

The original unit as delineated on the Unit Field Recon Card (11/90) and as presented in Alternative 4 (1/91) has carried through to this point with no adjustments in design. The following wildlife concerns would be mitigated while standing sawtimber and utility volume would be utilized.

UNIT ATTRIBUTES

Predominant Species: WH/SS mixed Age Class: OG 200+

Acres by Volume Class:Unit Volume:

<u>17</u> Volume Class 4 (8-20 mbf/acre)	<u>268</u> mbf Net Saw	<u> </u> Saw/Util
<u> </u> Volume Class 5 (20-30 mbf/acre)	<u> </u> Volume/Acre (net Sawlog): <u>15</u> mbf	
<u> </u> Volume Class 6 (30-50 mbf/acre)		
<u> </u> Volume Class 7 (50+ mbf/acre)		

Road Development: Specified Road Within Unit: .2 Miles; #'s 51540
 Spur Road Within Unit: 0 Miles
 Landings: 3

RESOURCE CONCERN (C), MANAGEMENT OBJECTIVES (O), AND MITIGATION DIRECTION (D)Wildlife

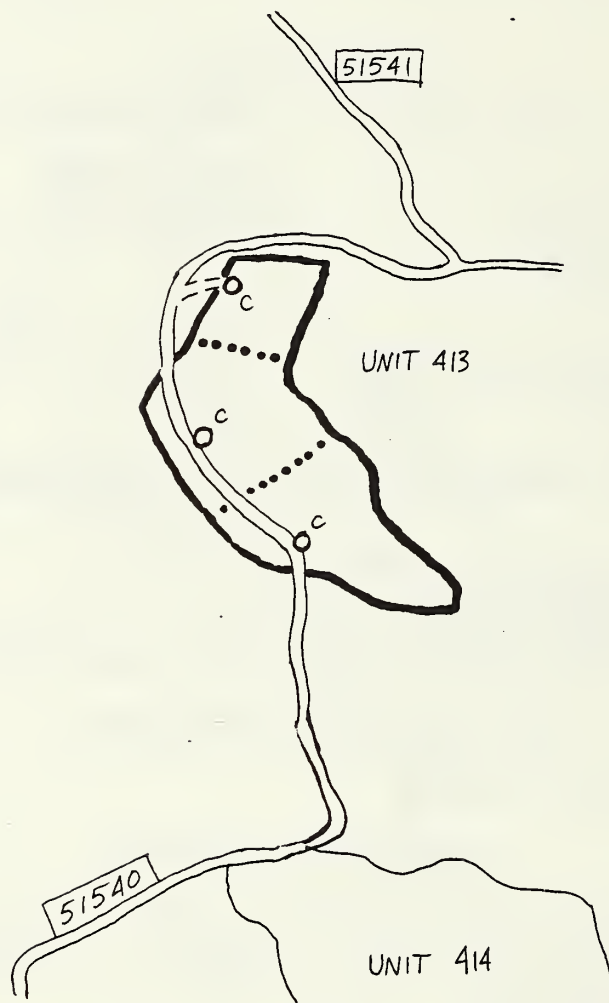
- C: The south end of this unit is used by moulting geese.
 O: Protect goose moulting areas.
 D: By harvesting only 2 of the 5 potential units in proximity to the goose-moulting habitat (which Alternative 4 has done), this concern has been alleviated.

PROPOSED ACTION OR DEVELOPMENT

Stand is planned for highlead yarding.

DESIRED FUTURE CONDITION

OBJ: Maximize wood fiber production while maintaining within stand diversity.
 SITE PREP: none; REGEN: Natural; THIN: YEAR- ; SPACING- ; ROTATION: 100; I/D: none;
 CONTROL: none; ENHAN: none; MONITORING: Year 3/5; CERT: 1997; OTHER COMMENTS: Reforestation
reviews at year 3 and 5 post harvest.

UNIT NO. 413Approximate Drawing Scale: 1" = 660 feet (top of page is north)

Legend:

Planned Unit Boundary		Helicopter Yarding (clearcut)	<i>Hec</i>
Setting Boundary		Helicopter Yarding (group selection)	<i>Heg</i>
Setting Number		Cable Yarding	<i>C</i>
Existing Road		Full Suspension	
Planned Spec. Road		Partial Suspension	
Planned Temp. Road		Watercourse	
Road Number		AHMu Stream Classification	<i>III</i>
Permanent Bridge		AHMu Stream Classification boundary	
Temporary Bridge		Watercourse-Primary Protection	
Landing		Watercourse-Secondary Protection	
Existing Clearcut	<i>CC</i>	Watercourse with 100-foot Buffer	
Internal Exclusions			

TIMBER SALE: STARFISH (ETOLIN) UNIT SUMMARY UNIT NUMBER: 414
 Management Area S23 VCU 464 Compartment 239 Stand 813 Acres: 16

UNIT DEVELOPMENT

The original unit as delineated on the Unit Field Recon Card (11/90) and as presented in Alternative 4 (1/91) has carried through to this point with no adjustments in design. The following wildlife concerns would be mitigated while standing sawtimber and utility volume would be utilized.

UNIT ATTRIBUTES

Predominant Species: WH/SS mixed Age Class: OG 200+

Acres by Volume Class:

10 Volume Class 4 (8-20 mbf/acre)
6 Volume Class 5 (20-30 mbf/acre)
 Volume Class 6 (30-50 mbf/acre)
 Volume Class 7 (50+ mbf/acre)

Unit Volume:

324 mbf Net Saw Saw/Util
 Volume/Acre (net Sawlog): 20 mbf

Road Development: Specified Road Within Unit: 0 Miles; #'s _____
 Spur Road Within Unit: .1 Miles
 Landings: 2

RESOURCE CONCERN (C), MANAGEMENT OBJECTIVES (O), AND MITIGATION DIRECTION (D)Wildlife

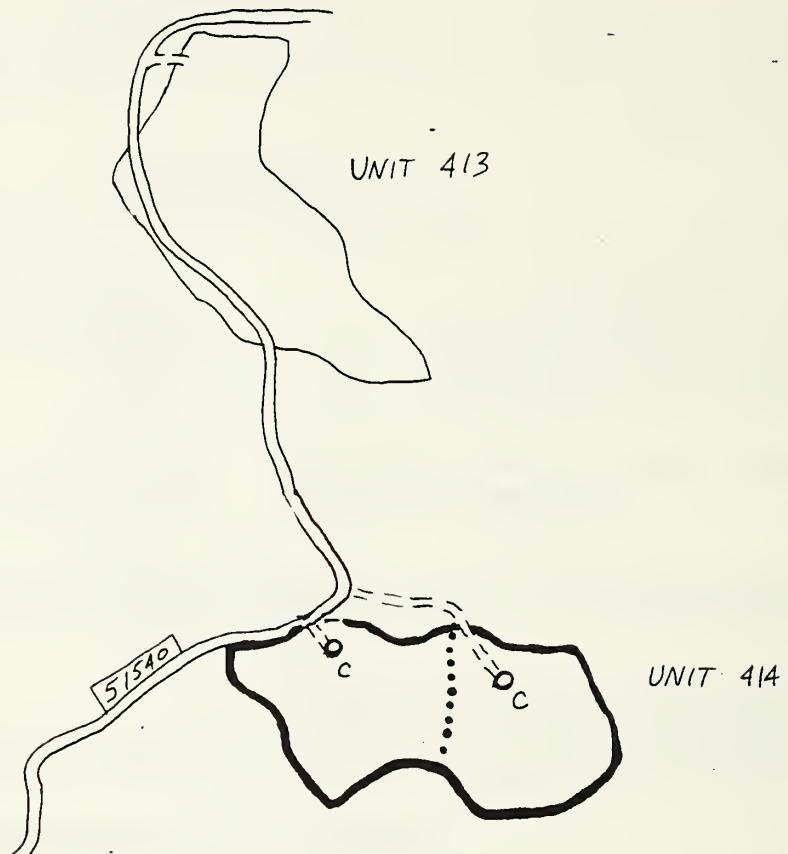
- C: This unit is used by moulting geese.
 O: Protect goose moulting areas.
 D: By hgarvesting only 2 of the 5 potential units in proximity to the goose-moulting habitat (which Alternative 4 has done), this concern has been alleviated.

PROPOSED ACTION OR DEVELOPMENT

Stand will be planned for highlead yarding.

DESIRED FUTURE CONDITION

BJ: Maximize wood fiber production while maintaining within stand diversity.
 SITE PREP: none; REGEN: Natural; THIN: YEAR- ; SPACING- ; ROTATION: 100; I/D: none;
 CONTROL: none; ENHAN: none; MONITORING: Year 3/5; CERT: 1997; OTHER COMMENTS: Reforestation
reviews at year 3 and 5 post harvest.

UNIT NO. 414

Approximate Drawing Scale: 1" = 660 feet (top of page is north)

Legend:

Planned Unit Boundary		Helicopter Yarding (clearcut)	<i>Hec</i>
Setting Boundary		Helicopter Yarding (group selection)	<i>Heg</i>
Setting Number		Cable Yarding	<i>C</i>
Existing Road		Full Suspension	
Planned Spec. Road		Partial Suspension	
Planned Temp. Road		Watercourse	
Road Number		AHMu Stream Classification	<i>III</i>
Permanent Bridge		AHMu Stream Classification boundary	
Temporary Bridge		Watercourse-Primary Protection	
Landing		Watercourse-Secondary Protection	
Existing Clearcut	<i>CC</i>	Watercourse with 100-foot Buffer	
Internal Exclusions			

TIMBER SALE: STARFISH (ETOLIN) UNIT SUMMARY UNIT NUMBER: 415
 Management Area S23 VCU 467 Compartment 244 Stand 802 Acres: 26

UNIT DEVELOPMENT

The original unit as delineated on the Unit Field Recon Card (11/90) and as presented in Alternative 4 (1/91) has carried through to this point with no adjustments in design. The harvest of sawtimber and utility volume is expected to have no significant impact on the forest ecosystem.

UNIT ATTRIBUTES

Predominant Species: WH/SS mixed Age Class: OG 200+

Acres by Volume Class:Unit Volume:

11 Volume Class 4 (8-20 mbf/acre)

573 mbf Net Saw Saw/Util

15 Volume Class 5 (20-30 mbf/acre)

Volume/Acre (net Sawlog): 21 mbf

 Volume Class 6 (30-50 mbf/acre)

 Volume Class 7 (50+ mbf/acre)

Road Development: Specified Road Within Unit: 0 Miles; #'s
 Spur Road Within Unit: .2 Miles
 Landings: 2

RESOURCE CONCERN (C), MANAGEMENT OBJECTIVES (O), AND MITIGATION DIRECTION (D)Wildlife

C: North 3/4 of unit has high value marten habitat.

O:

D: Not possible to mitigate loss of marten habitat.

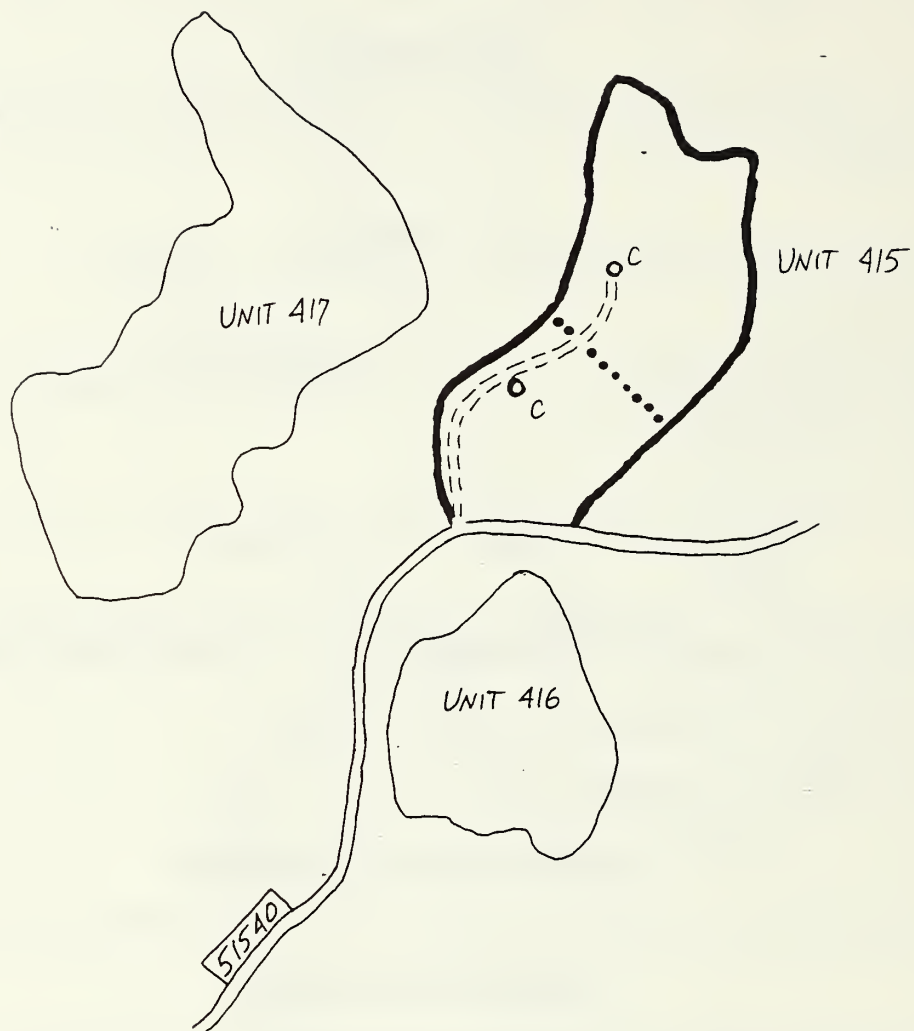
PROPOSED ACTION OR DEVELOPMENT

Stand will be planned for highlead yarding consisting of settings 51 and 52.

DESIRED FUTURE CONDITION

OBJ: Maximize wood fiber production while maintaining within stand diversity.

SITE PREP: none; REGEN: Natural; THIN: YEAR- ; SPACING- ; ROTATION: 100; I/D: none;
 CONTROL: none; ENHAN: none; MONITORING: Year 3/5; CERT: 1997; OTHER COMMENTS: Reforestation
reviews at year 3 and 5 post harvest.

UNIT NO. 415

Approximate Drawing Scale:

1" = 660 feet (top of page is north)

Legend:

Planned Unit Boundary
 Setting Boundary
 Setting Number
 Existing Road
 Planned Spec. Road
 Planned Temp. Road
 Road Number
 Permanent Bridge
 Temporary Bridge
 Landing
 Existing Clearcut
 Internal Exclusions

Helicopter Yarding (clearcut)
 Helicopter Yarding (group selection)
 Cable Yarding
 Full Suspension
 Partial Suspension
 Watercourse
 AHMU Stream Classification
 AHMU Stream Classification boundary
 Watercourse-Primary Protection
 Watercourse-Secondary Protection
 Watercourse with 100-foot Buffer

TIMBER SALE: STARFISH (ETOLIN) UNIT SUMMARY UNIT NUMBER: 416
 Management Area S23 VCU 467 Compartment 244 Stand 803 Acres: 18

UNIT DEVELOPMENT

The original unit as delineated on the Unit Field Recon Card (11/90) and as presented in Alternative 4 (1/91) has carried through to this point with no adjustments in design. The following fisheries and water quality concerns would be mitigated while standing sawlog and utility volume would be utilized.

UNIT ATTRIBUTES

Predominant Species: WH/SS mixed Age Class: OG 200+

Acres by Volume Class:Unit Volume:

18 Volume Class 4 (8-20 mbf/acre)

309 mbf Net Saw

Saw/Util

Volume Class 5 (20-30 mbf/acre)

Volume/Acre (net Sawlog): 17 mbf

Volume Class 6 (30-50 mbf/acre)

Volume Class 7 (50+ mbf/acre)

Road Development: Specified Road Within Unit: 0 Miles; #'s _____
 Spur Road Within Unit: .1 Miles
 Landings: 2

RESOURCE CONCERN (C), MANAGEMENT OBJECTIVES (O), AND MITIGATION DIRECTION (D)Fisheries/Water Quality

- C: Water quality of Class I channel downstream of Unit.
 O:
 D: Protect tributary banks within Unit by ensuring FULL SUSPENSION over central tributary (BMP 13.9) and provide SECONDARY PROTECTION (BMP 13.16) while preventing damage to sideslopes.

Soils

- C: Soil stability
 O: Minimize soil erosion in important water quality stream.
 D: Recommend PARTIAL SUSPENSION where possible in this unit, especially on small, unmappable channels and rills. (BMP 13.9)

Wildlife

- C: Entire unit is high value marten habitat.
 O:
 D: No mitigation possible.

PROPOSED ACTION OR DEVELOPMENT

Stand will require full suspension across the Class III stream that runs through the unit. Running skyline is planned to provide suspension across the channel in the southern half of the unit. Yarding away from the creek is planned to protect the channel through the north half.

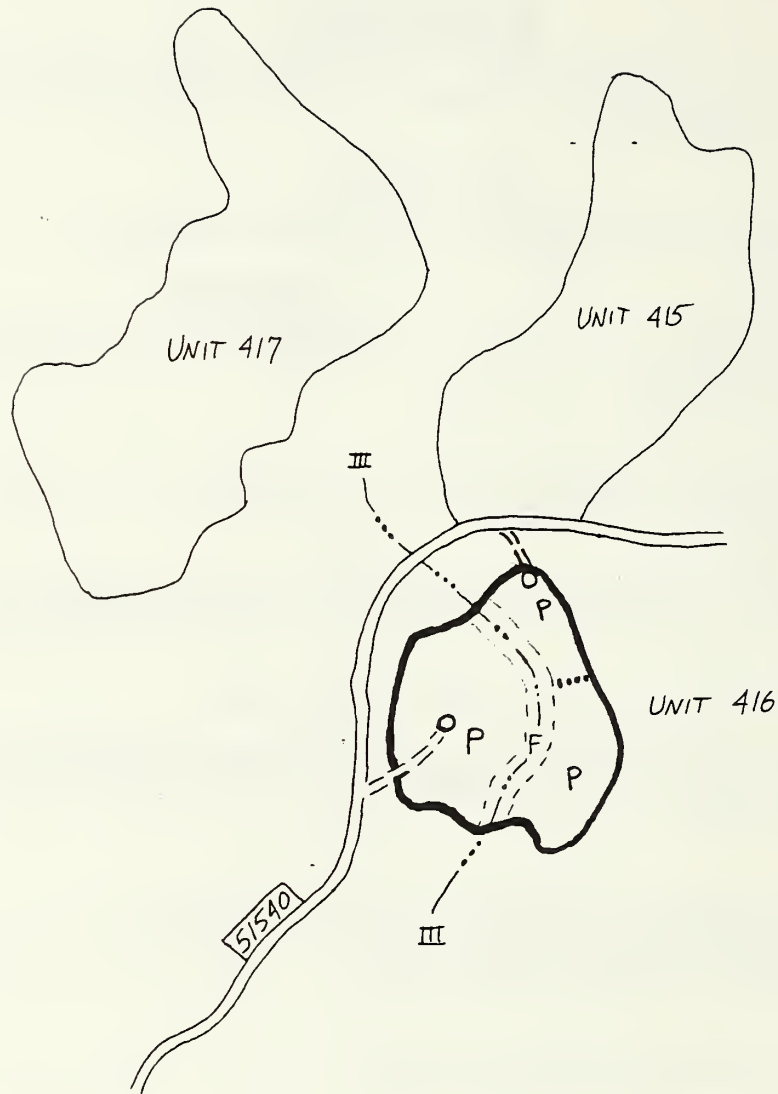
DESIRED FUTURE CONDITION

OBJ: Maximize wood fiber production while maintaining within stand diversity.
 SITE PREP: none; REGEN: Natural; THIN: YEAR- ; SPACING- ; ROTATION: 100; I/D: none;
 CONTROL: none; ENHAN: none; MONITORING: Year 3/5; CERT: 1997; OTHER COMMENTS: Reforestation reviews at year 3 and 5 post harvest.

UNIT DESCRIPTION





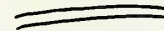







Page 2 of 2







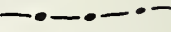
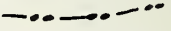
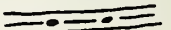
UNIT NO. 416



Approximate Drawing Scale: 1" = 660 feet (top of page is north)

Legend:

Planned Unit Boundary 
 Setting Boundary 
 Setting Number 
 Existing Road 
 Planned Spec. Road 
 Planned Temp. Road 
 Road Number 
 Permanent Bridge 
 Temporary Bridge 
 Landing 
 Existing Clearcut 
 Internal Exclusions 

Helicopter Yarding (clearcut) *Hec*
 Helicopter Yarding (group selection) *Heg*
 Cable Yarding 
 Full Suspension 
 Partial Suspension 
 Watercourse 
 AHMU Stream Classification 
 AHMU Stream Classification boundary 
 Watercourse-Primary Protection 
 Watercourse-Secondary Protection 
 Watercourse with 100-foot Buffer 

TIMBER SALE: STARFISH (ETOLIN) UNIT SUMMARY UNIT NUMBER: 417
 Management Area S23 VCU 467 Compartment 244 Stand 805 Acres: 36

UNIT DEVELOPMENT

The original unit as delineated on the Unit Field Recon Card (11/90) and as presented in Alternative 4 (1/91) has carried through to this point with no adjustments in design. The following fisheries concerns would be mitigated while standing sawlog and utility volume would be utilized.

UNIT ATTRIBUTES

Predominant Species: WH/SS mixed Age Class: OG 200+

Acres by Volume Class:Unit Volume:

36 Volume Class 4 (8-20 mbf/acre)
 Volume Class 5 (20-30 mbf/acre)
 Volume Class 6 (30-50 mbf/acre)
 Volume Class 7 (50+ mbf/acre)

464 mbf Net Saw Saw/Util
 Volume/Acre (net Sawlog): 13 mbf

Road Development: Specified Road Within Unit: 0 Miles; #'s
 Spur Road Within Unit: .2 Miles
 Landings: 2

RESOURCE CONCERN (C), MANAGEMENT OBJECTIVES (O), AND MITIGATION DIRECTION (D)Fisheries

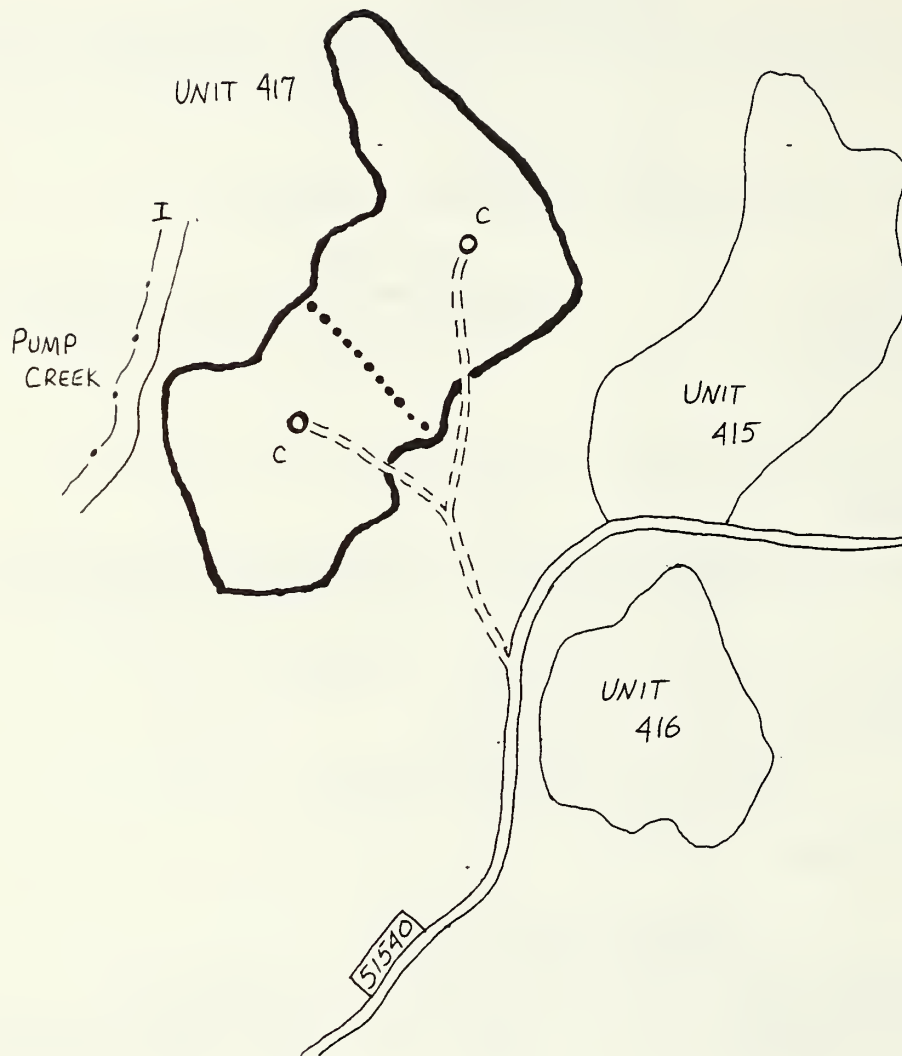
C: Riparian protection of Pump Creek (AHMU Class I stream).
 O: Protect fish habitat.
 D: Maintain minimum 100-foot buffer of Pump Creek

PROPOSED ACTION OR DEVELOPMENT

Stand will be highlead yarded.

DESIRED FUTURE CONDITION

OBJ: Maximize wood fiber production while maintaining within stand diversity.
 SITE PREP: none; REGEN: Natural; THIN: YEAR- ; SPACING- ; ROTATION: 100; I/D: none;
 CONTROL: none; ENHAN: none; MONITORING: Year 3/5; CERT: 1997; OTHER COMMENTS: Reforestation
reviews at year 3 and 5 post harvest.

UNIT NO. 417

Approximate Drawing Scale: 1" = 660 feet (top of page is north)

Legend:

Planned Unit Boundary		Helicopter Yarding (clearcut)	<i>Hec</i>
Setting Boundary		Helicopter Yarding (group selection)	<i>Heg</i>
Setting Number		Cable Yarding	<i>C</i>
Existing Road		Full Suspension	
Planned Spec. Road		Partial Suspension	
Planned Temp. Road		Watercourse	
Road Number		AHMU Stream Classification	<i>III</i>
Permanent Bridge		AHMU Stream Classification boundary	
Temporary Bridge		Watercourse-Primary Protection	
Landing		Watercourse-Secondary Protection	
Existing Clearcut	<i>CC</i>	Watercourse with 100-foot Buffer	
Internal Exclusions			

TIMBER SALE: STARFISH (ETOLIN) UNIT SUMMARY UNIT NUMBER: 418
 Management Area S23 VCU 467 Compartment 244 Stand 805 Acres: 73

UNIT DEVELOPMENT

The original unit as delineated on the Unit Field Recon Card (11/90) and as presented in Alternative 4 (1/91) consisted of 4 settings within a single harvest unit. In order to address and mitigate fisheries, water quality, and wildlife concerns, acres were deleted and the Unit then consisted of 3 separated cutting units. Preliminary road recon (5/91) changed the location of Road No. 51540 and acres were added back into setting 43 (cable yarder landing # 2). The alleviation of these concerns would facilitate the acceptable utilization of standing sawtimber and utility volume with no significant impact upon the forest ecosystem.

UNIT ATTRIBUTES

Predominant Species: WH/SS mixed Age Class: OG 200+

Acres by Volume Class:

Volume Class 4 (8-20 mbf/acre)
73 Volume Class 5 (20-30 mbf/acre)
 Volume Class 6 (30-50 mbf/acre)
 Volume Class 7 (50+ mbf/acre)

Unit Volume:

1,913 mbf Net Saw Saw/Util
 Volume/Acre (net Sawlog): 26 mbf

Road Development: Specified Road Within Unit: .6 Miles; #'s _____
 Spur Road Within Unit: .2 Miles
 Landings: 5

RESOURCE CONCERN (C), MANAGEMENT OBJECTIVES (O), AND MITIGATION DIRECTION (D)Fisheries/Water Quality

- C: Riparian protection of AHMU Class I and Class II streams.
- O: Minimize impacts on fisheries habitat and maintain water quality.
- D: Maintain minimum 100-foot buffer on Pump and Hump Creeks in settings 43-46 (BMP 12.6). Fisheries biologist should assist in boundary location.

Wildlife

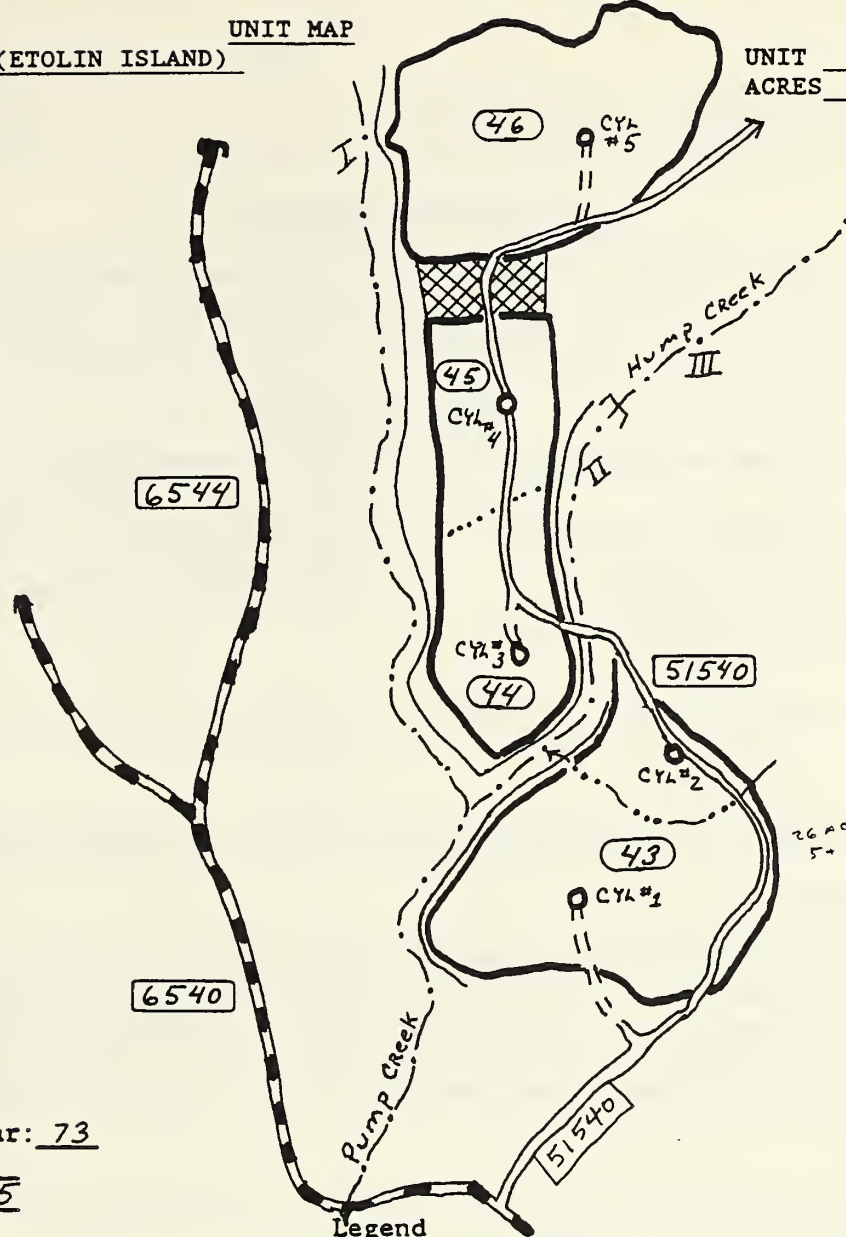
- C: Maintenance of travel corridors through the unit. Most of the unit is high value marten habitat.
- O: Retain a travel corridor between Pump Creek and muskegs.
- D: Exclude a narrow strip (approximately 3-4 acres) between settings 45 and 46. The 200-foot buffer (total width) along Hump Creek between settings 43 and 44 will contribute to mitigate the travel corridor concern. It's not possible to mitigate the loss of marten habitat.

PROPOSED ACTION OR DEVELOPMENT

Stand will be highlead yarded. Fisheries biologist will assist in determinig the location of the 100-foot buffer along Pump and Hump Creeks.

DESIRED FUTURE CONDITION

OBJ:Maximize wood fiber production while maintaining within stand diversity.
SITE PREP: none; REGEN: Natural; THIN: YEAR- ; SPACING- ; ROTATION: 100; I/D: none;
CONTROL: none; ENHAN: none; MONITORING: Year 3/5; CERT: 1997; OTHER COMMENTS: Monitor
effectiveness of 100-buffers and internal exclusions (travel corridor) during reforestation
reviews at year 3 and 5 post harvest. Note
results of monitoring on Monitoring Card.

Aerial Photo Year: 73Flight Line: 14Photo Number: 65

Legend

Approx. Map Scale: 1" = 660 ft.

	Unit Boundary		Suspension Required
	Internal Exclusion		Partial (1 End)
	Specified Road		Full (Both Ends)
	Existing		Setting Boundary
	Construction		Setting Number
	Reconstruction		Cable Yarder Landing
	Specified Road Number		Helicopter Landing
	Spur Road		Truck Landing
	Log Transfer Facility		Saltwater Area
	Hydraulic Site (Bridge/Lg Culvert)		Streams
	Potential Rock Source		Watercourse
	Harvest System		Anadromous
	Cable		Resident
	Shovel		Water Quality
	Helicopter (Clearcut)		Classification Limits
	Helicopter (Group Selection)		Primary Protection
	Tractor		Secondary Protection
	Existing Clearcut		Stream Buffer
	Potential Camp		100' Minimum
	Potential Sortyard		Other Distance

TIMBER SALE: STARFISH (ETOLIN) UNIT SUMMARY UNIT NUMBER: 419
 Management Area S23 VCU 467 Compartment 244 Stand 806 Acres: 73

UNIT DEVELOPMENT

The original unit as delineated on the Unit Field Recon Card (11/90) and as presented in Alternative 4 (1/91) has been altered in design and in decreased in size in order to address and mitigate fisheries, water quality, and wildlife concerns. The alleviation of these concerns would facilitate the acceptable utilization of standing sawtimber and utility volume with no significant impact upon the forest ecosystem.

UNIT ATTRIBUTES

Predominant Species: WH/SS mixed Age Class: OG 200+

Acres by Volume Class:	Unit Volume:
<u>73</u> Volume Class 4 (8-20 mbf/acre)	<u>1,362</u> mbf Net Saw <u> </u> Saw/Util
<u> </u> Volume Class 5 (20-30 mbf/acre)	Volume/Acre (net Sawlog): <u>20</u> mbf
<u> </u> Volume Class 6 (30-50 mbf/acre)	
<u> </u> Volume Class 7 (50+ mbf/acre)	

Road Development: Specified Road Within Unit: .3 Miles; #'s 51544
 Spur Road Within Unit: 0 Miles
 Landings: 3

RESOURCE CONCERN (C), MANAGEMENT OBJECTIVES (O), AND MITIGATION DIRECTION (D)

Fisheries/Water Quality

- C: Protection of AHMU Class I stream just below Unit.
- O: Minimize impacts on fisheries habitat and maintain water quality.
- D: Utilize tributaries within Unit as splitlines (BMP 13.16). Establish northeastern boundary to the south of the V-notch slope break at a distance equal to the height of an average codominant tree in the vicinity to allow natural feathering in the event of any windthrow. Ensure secondary protection along splitline channels. Hydrologist will assist in layout.

Wildlife

- C: Cumulative effects of harvest in vicinity on upland landbirds.
- O: Maintain within stand diversity.
- D: Exclude a small portion (1-2 acres) of timber between settings 41 and 42. Finger along splitlines between settings 40 and 41 will also mitigate this concern.

Visuals

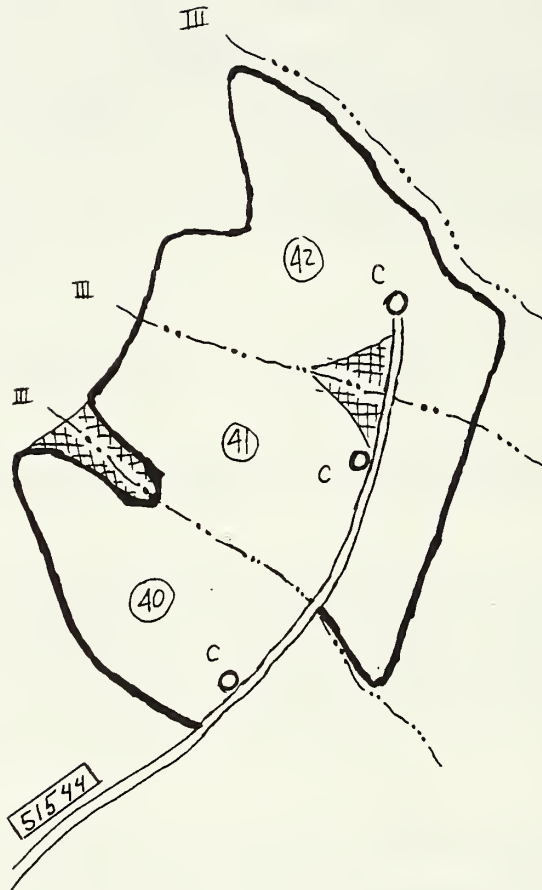
- C: Upper portions of the Unit would be visible as background from both Mosman Inlet and Anita Bay.
- O: Lessen visual impact in background. Unit appearance should not cause greater visual impact than the inventoried VQO of "modification".
- D: Exclude a narrow finger (approximately 2 acres) from backline along splitline between settings 40 and 41. Landscape architect should assist layout.

PROPOSED ACTION OR DEVELOPMENT

Stand will be highlead yarded. Hydrologist and LA will assist in layout.

DESIRED FUTURE CONDITION

OBJ: Maximize wood fiber production while maintaining within stand diversity.
SITE PREP: none; REGEN: Natural; THIN: YEAR- ; SPACING- ; ROTATION: 100; I/D: none;
CONTROL: none; ENHAN: none; MONITORING: Year 3/5; CERT: 1997; OTHER COMMENTS: Monitor
effectiveness internal exclusions (V-notch) during
reforestation reviews at year 3 and 5 post harvest. Note results of monitoring
on Monitoring Card.

UNIT NO. 419

Approximate Drawing Scale: 1" = 660 feet (top of page is north)

Legend:

Planned Unit Boundary

Setting Boundary

Setting Number

Existing Road

Planned Spec. Road

Planned Temp. Road

Road Number

Permanent Bridge

Temporary Bridge

Landing

Existing Clearcut

Internal Exclusions

Helicopter Yarding (clearcut)

Helicopter Yarding (group selection)

Cable Yarding

Full Suspension

Partial Suspension

Watercourse

AHMu Stream Classification

AHMu Stream Classification boundary

Watercourse-Primary Protection

Watercourse-Secondary Protection

Watercourse with 100-foot Buffer

TIMBER SALE: STARFISH (ETOLIN) UNIT SUMMARY UNIT NUMBER: 420
 Management Area S23 VCU 467 Compartment 244 Stand 807 Acres: 53

UNIT DEVELOPMENT

The original unit as delineated on the Unit Field Recon Card (11/90) and as presented in Alternative 4 (1/91) has been altered in design and in decreased in size in order to address and mitigate fisheries, visual, water quality, and wildlife habitat concerns. The alleviation of these concerns would facilitate the acceptable utilization of standing sawtimber and utility volume with no significant impact upon the forest ecosystem.

UNIT ATTRIBUTES

Predominant Species: WH/SS mixed Age Class: OG 200+

Acres by Volume Class:

53 Volume Class 4 (8-20 mbf/acre)

53 Volume Class 5 (20-30 mbf/acre)

53 Volume Class 6 (30-50 mbf/acre)

53 Volume Class 7 (50+ mbf/acre)

Unit Volume:

1,136 mbf Net Saw Saw/Util

Volume/Acre (net Sawlog): 25 mbf

Road Development: Specified Road Within Unit: .3 Miles; #'s 51441
 Spur Road Within Unit: 0 Miles
 Landings: 3

RESOURCE CONCERN (C), MANAGEMENT OBJECTIVES (O), AND MITIGATION DIRECTION (D)Fisheries/Water Quality

- C: Protection of AHMU Class I channel downstream.
- O: Minimize impacts on fisheries habitat and maintain water quality.
- D: Utilize tributary within unit as splitline (BMP 13.16) and provide secondary protection. Notify specialist if channel location deviates significantly from map on page 2.

Wildlife

- C: Cumulative effects of harvest in vicinity on deer, upland landbirds, and furbearers. The entire unit is high value marten habitat
- O: Maintain within stand diversity.
- D: Exclude a small portion (about 1 acre) of timber below the road and east of the draw. A wildlife biologist should assist in layout. It's not possible to mitigate the loss of marten habitat.

Visual Quality

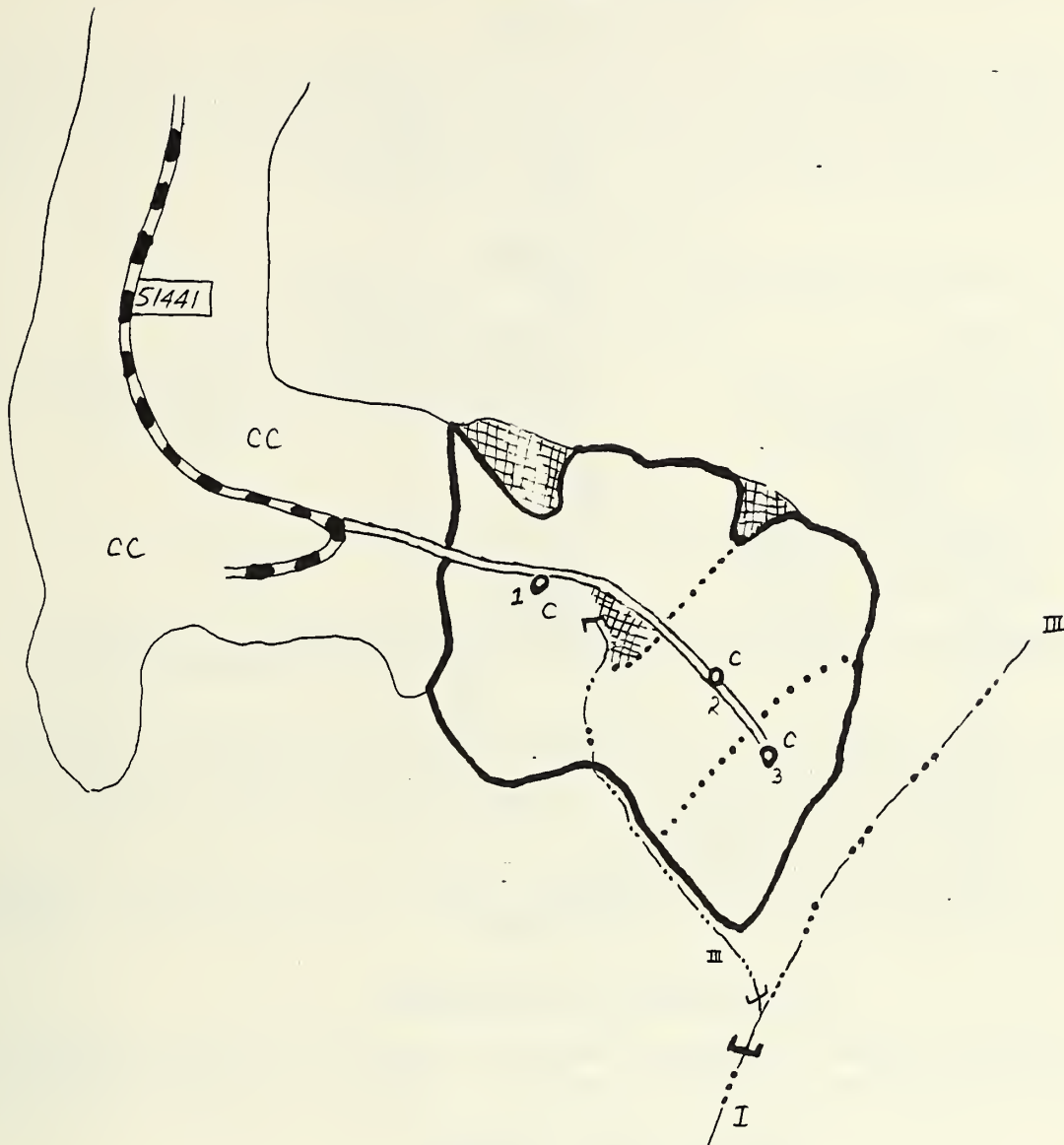
- C: Upper portions of the Unit would be visible as background from Mosman Inlet. Adjacency to existing "square-cornered" clearcut.
- O: Lessen visual impact in background. Unit appearance should not cause greater visual impact than the inventoried VQO of "modification".
- D: Exclude a finger of timber (about 2 acres) from NW corner to the second landing and from backline along splitline between landings #1 and 2 (about 1 acre). A landscape architect should assist layout.

PROPOSED ACTION OR DEVELOPMENT

Stand will be highlead yarded. Wildlife biologist and LA will assist in design and layout of the within-stand exclusions.

DESIRED FUTURE CONDITION

OBJ:Maximize wood fiber production while maintaining within stand diversity.
SITE PREP: none; REGEN: Natural; THIN: YEAR- ; SPACING- ; ROTATION: 100; I/D: none;
CONTROL: none; ENHAN: none; MONITORING: Year 3/5; CERT: 1997; OTHER COMMENTS: Monitor
effectiveness internal exclusions (V-notch) during
reforestation reviews at year 3 and 5 post harvest. Note results of monitoring
on Monitoring Card.

UNIT NO. 420

Approximate Drawing Scale:

1" = 660 feet (top of page is north)

Legend:

Planned Unit Boundary	
Setting Boundary	
Setting Number	
Existing Road	
Planned Spec. Road	
Planned Temp. Road	
Road Number	
Permanent Bridge	
Temporary Bridge	
Landing	
Existing Clearcut	CC
Internal Exclusions	

Helicopter Yarding (clearcut)	Hec
Helicopter Yarding (group selection)	Heg
Cable Yarding	C
Full Suspension	
Partial Suspension	
Watercourse	
AHMu Stream Classification	III
AHMu Stream Classification boundary	
Watercourse-Primary Protection	
Watercourse-Secondary Protection	
Watercourse with 100-foot Buffer	

TIMBER SALE: STARFISH (ETOLIN) UNIT SUMMARY UNIT NUMBER: 421
 Management Area S23 VCU 467 Compartment 244 Stand 808 Acres: 98

UNIT DEVELOPMENT

The original unit as delineated on the Unit Field Recon Card (11/90) and as presented in Alternative 4 (1/91) has been altered in design and in decreased in size in order to address and mitigate the following wildlife habitat concerns. The alleviation of these concerns would facilitate the acceptable utilization of standing sawtimber and utility volume with no significant impact upon the forest ecosystem.

UNIT ATTRIBUTES

Predominant Species: WH/SS mixed Age Class: OG 200+

Acres by Volume Class:

Unit Volume:

<u>98</u> Volume Class 4 (8-20 mbf/acre)	<u>2,948</u> mbf Net Saw	<u> </u> Saw/Util
<u> </u> Volume Class 5 (20-30 mbf/acre)	<u> </u> Volume/Acre (net Sawlog):	<u>30</u> mbf
<u> </u> Volume Class 6 (30-50 mbf/acre)		
<u> </u> Volume Class 7 (50+ mbf/acre)		

Road Development: Specified Road Within Unit: 0 Miles; #'s
 Spur Road Within Unit: .3 Miles
 Landings: 4

RESOURCE CONCERN (C), MANAGEMENT OBJECTIVES (O), AND MITIGATION DIRECTION (D)

Wildlife

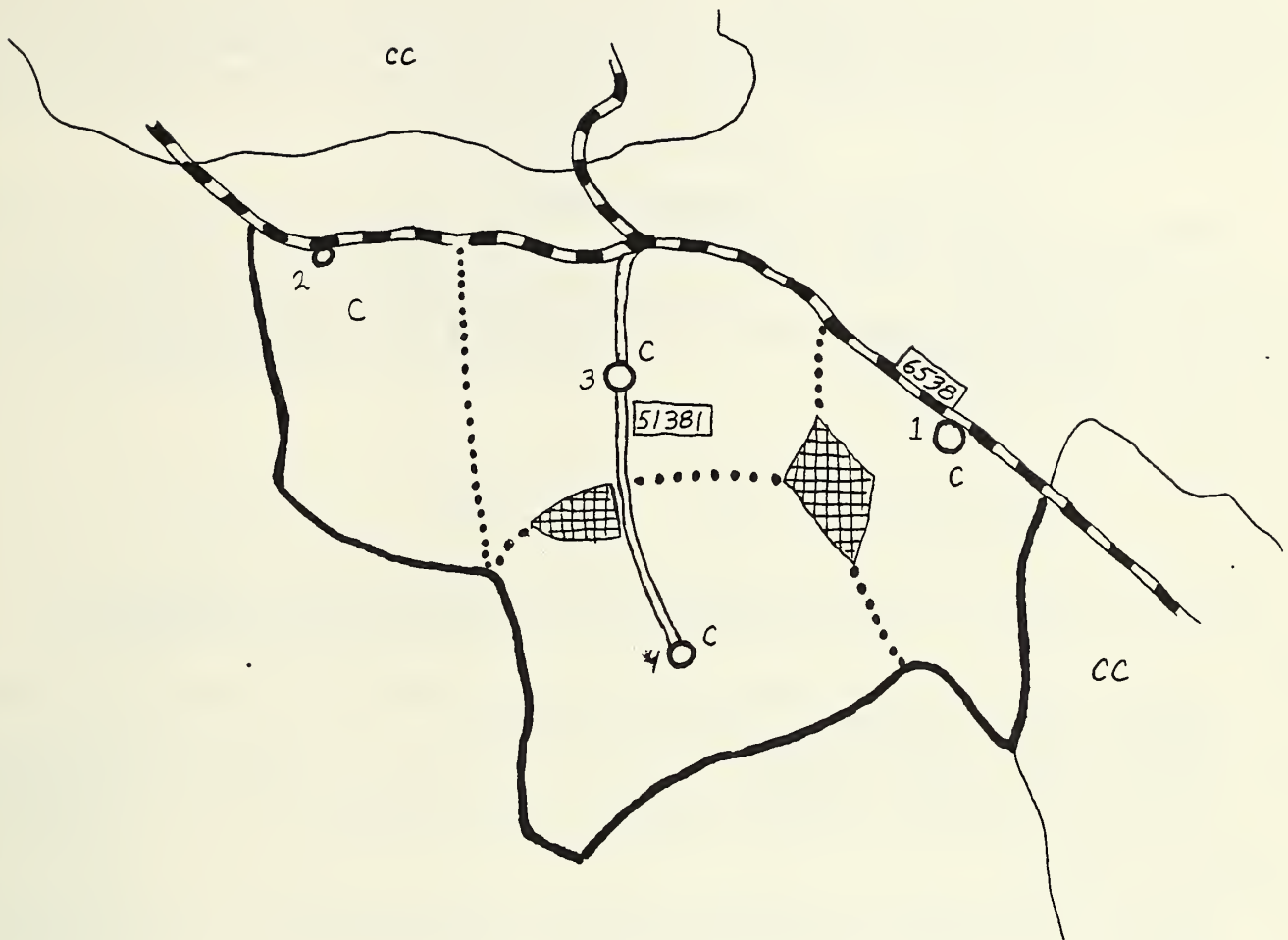
- C: The lack of structural diversity for upland landbirds and furbearers following harvest. The east 1/3 if the unit is high value marten habitat. There are 45 acres towards the east end of the unit that are high value deer winter range
- O: Maintain within-stand diversity.
- D: Exclude 2 separate centrally-located islands of timber within the Unit as presented on map. Wildlife biologist will assist in layout. It's not possible to mitigate the loss of deer winter range or the marten habitat.

PROPOSED ACTION OR DEVELOPMENT

Stand will be highlead yarded. Landings 1 and 2 are located on existing specified road #6538. Wildlife biologist will assist in design and layout of the within stand exclusions.

DESIRED FUTURE CONDITION

OBJ: Maximize wood fiber production while maintaining within stand diversity.
 SITE PREP: none; REGEN: Natural; THIN: YEAR- ; SPACING- ; ROTATION: 100; I/D: none;
 CONTROL: none; ENHAN: none; MONITORING: Year 3/5; CERT: 1997; OTHER COMMENTS: Monitor effectiveness internal exclusions during reforestation
reviews at year 3 and 5 post harvest. Note results of monitoring on Monitoring Card.

UNIT NO. 421

Approximate Drawing Scale: 1" = 660 feet (top of page is north)

Legend:

Planned Unit Boundary		Helicopter Yarding (clearcut)	<i>Hec</i>
Setting Boundary		Helicopter Yarding (group selection)	<i>Heg</i>
Setting Number		Cable Yarding	<i>C</i>
Existing Road		Full Suspension	
Planned Spec. Road		Partial Suspension	
Planned Temp. Road		Watercourse	
Road Number		AHMU Stream Classification	<i>III</i>
Permanent Bridge		AHMU Stream Classification boundary	
Temporary Bridge		Watercourse-Primary Protection	
Landing		Watercourse-Secondary Protection	
Existing Clearcut	<i>CC</i>	Watercourse with 100-foot Buffer	
Internal Exclusions			

TIMBER SALE: STARFISH (ETOLIN) UNIT SUMMARY UNIT NUMBER: 422
 Management Area S23 VCU 467 Compartment 244 Stand 809 Acres: 13

UNIT DEVELOPMENT

The original unit as delineated on the Unit Field Recon Card (11/90) and as presented in Alternative 4 (1/91) has been altered in design and in decreased in order to address and mitigate the following wildlife habitat, fisheries and water quality concerns. Further field recon by the soil scientist on 4/91 altered the unit to avoid the impacts of harvesting on oversteepened slopes. The alleviation of these concerns would facilitate the acceptable utilization of standing sawtimber and utility volume with no significant impact upon the forest ecosystem.

UNIT ATTRIBUTES

Predominant Species: WH/SS mixed Age Class: OG 200+

Acres by Volume Class:

Unit Volume:

<u>13</u> Volume Class 4 (8-20 mbf/acre)	<u>254</u> mbf Net Saw	<u> </u> Saw/Util
<u> </u> Volume Class 5 (20-30 mbf/acre)	<u> </u> Volume/Acre (net Sawlog): <u>20</u> mbf	
<u> </u> Volume Class 6 (30-50 mbf/acre)		
<u> </u> Volume Class 7 (50+ mbf/acre)		

Road Development: Specified Road Within Unit: 0 Miles; #'s
 Spur Road Within Unit: .2 Miles
 Landings: 2

RESOURCE CONCERN (C), MANAGEMENT OBJECTIVES (O), AND MITIGATION DIRECTION (D)

Wildlife

- C: Cumulative impacts of the harvest of this unit in conjunction with current extent of harvest on upland landbirds, furbearers, and deer.
- O: Maintain within stand diversity.
- D: Exclude a small block (2 acres) along the tributary forming the splitline between setting CYL #1 and #2. Wildlife biologist assist in layout

Fisheries/Water Quality

- C: Habitat of AHMU Class II stream on western boundary of Unit.
- O: Minimize the impacts of timber harvesting and road construction on the fisheries habitat.
- D: Ensure minimum 100-foot buffer and PRIMARY PROTECTION on Class II stream along western boundary. Utilize Class III stream within Unit as splitline (BMP 13.16).

Soils

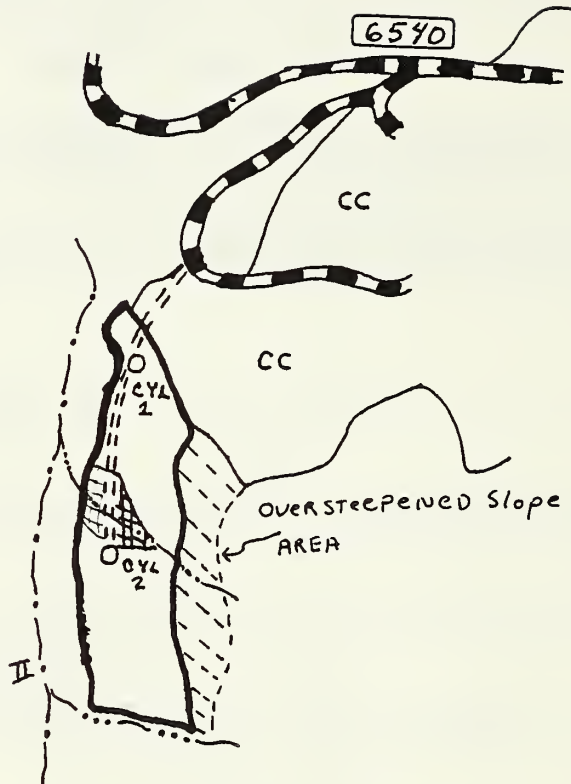
- C: Oversteepened slopes above eastern boundary of unit.
- O: Minimize the impacts of timber harvesting in these high hazard soil areas.
- D: Ensure that the unit boundary is located at the base of these oversteepened slopes. See unit map. (BMP'S 13.2 & 13.3)

PROPOSED ACTION OR DEVELOPMENT

Stand will be highlead yarded. Southern boundary of unit parallels class III stream. Small 2 acre internal exclusion is located between landings 1 and 2 along class III stream splitline. Locate eastern unit boundary at the base of the oversteepened cliffs.

DESIRED FUTURE CONDITION

OBJ: Maximize wood fiber production while maintaining within stand diversity.
SITE PREP: none; REGEN: Natural; THIN: YEAR- ; SPACING- ; ROTATION: 100; I/D: none;
CONTROL: none; ENHAN: none; MONITORING: Year 3/5; CERT: 1997; OTHER COMMENTS: Monitor
effectiveness internal exclusions during reforestation
reviews at year 3 and 5 post harvest. Note results of monitoring on Monitoring
Card.



Aerial Photo Year: 73
Flight Line: 12
Photo Number: 8

Legend

Approx. Map Scale: 1" = 660 ft.

	Unit Boundary				
	Internal Exclusion	/P			Suspension Required
	Specified Road	/F			Partial (1 End)
	Existing			Full (Both Ends)
	Construction	(212)			Setting Boundary
	Reconstruction	CYL #1			Setting Number
	Specified Road Number	HLT			Cable Yarder Landing
	Spur Road	(HLSW)			Helicopter Landing
	Log Transfer Facility				Truck Landing
	Hydraulic Site (Bridge/Lg Culvert)				Saltwater Area
	Potential Rock Source				Streams
	Harvest System				Watercourse
C/	Cable	I			Anadromous
SH/	Shovel	II			Resident
Hec/	Helicopter(Clearcut)	III			Water Qaulity
Heg/	Helicopter(Group Selection)	[.....]			Classification Limits
T/	Tractor	[.....]			Primary Protection
cc	Exsiting Clearcut	[.....]			Secondary Protection
Camp	Potential Camp	[.....]			Stream Buffer
SortY.	Potential Sortyard	[.....]			100' Minimum
		[.....]			Other Distance

TIMBER SALE: STARFISH (ETOLIN) UNIT SUMMARY UNIT NUMBER: 423
 Management Area S23 VCU 467 Compartment 244 Stand 810 Acres: 48

UNIT DEVELOPMENT

The original 48 acre unit as delineated on the Unit Field Recon Card (11/90) and as presented in Alternative 4 (1/91) has been altered in design and decreased in size by 1 acres in order to address and mitigate wildlife habitat concerns. The alleviation of these concerns would facilitate the acceptable utilization of standing sawtimber and utility volume with no significant impact upon the forest ecosystem.

UNIT ATTRIBUTES

Predominant Species: WH/SS mixed Age Class: OG 200+

Acres by Volume Class:

Volume Class 4 (8-20 mbf/acre)

48 Volume Class 5 (20-30 mbf/acre)

Volume Class 6 (30-50 mbf/acre)

Volume Class 7 (50+ mbf/acre)

Unit Volume:

1.430 mbf Net Saw Saw/Util

Volume/Acre (net Sawlog): 30 mbf

Road Development: Specified Road Within Unit: .2 Miles; #'s 6542
 Spur Road Within Unit: .2 Miles
 Landings: 3

RESOURCE CONCERN (C), MANAGEMENT OBJECTIVES (O), AND MITIGATION DIRECTION (D)Wildlife

- C: Most of the unit is high value marten habitat.
 O:
 D: Not possible to mitigate the loss of marten habitat.

Fisheries/Water Quality

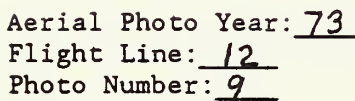
- C: Habitat of AHMU Class II stream on western boundary of Unit.
 O: Minimize the impacts of timber harvesting and road construction on the fisheries habitat.
 D: Ensure minimum 100-foot buffer and PRIMARY PROTECTION on Class II stream along western boundary. Utilize Class III stream within Unit as splitline (BMP 13.15).

PROPOSED ACTION OR DEVELOPMENT

Stand will be highlead yarded. Landing CYL # 1 is located on Specified Raod #6542. Small 1 acre block in upper-middle portion of unit is to be excluded.

DESIRED FUTURE CONDITION

OBJ: Maximize wood fiber production while maintaining within stand diversity.
 SITE PREP: none; REGEN: Natural; THIN: YEAR- ; SPACING- ; ROTATION: 100; I/D: none;
 CONTROL: none; ENHAN: none; MONITORING: Year 3/5; CERT: 1997; OTHER COMMENTS: Monitor effectiveness internal exclusions during reforestation reviews at year 3 and 5 post harvest. Note results of monitoring on Monitoring Card.



Approx. Map Scale: 1" = 660 ft.

STARFISH TIMBER SALE FEIS

TIMBER SALE: STARFISH (ETOLIN) UNIT SUMMARY UNIT NUMBER: 424
 Management Area S23 VCU 467 Compartment 244 Stand 811 Acres: 46

UNIT DEVELOPMENT

The original unit as delineated on the Unit Field Recon Card (11/90) and as presented in Alternative 4 (1/91) has been altered in design and decreased in size in order to address and mitigate water quality concerns between the Class III stream and the eastern boundary of the Unit. Based on 4/91 field recon by the soil scientist, 6 acres were added back into the unit. The alleviation of these concerns would facilitate the acceptable utilization of standing sawtimber and utility volume with no significant impact upon the forest ecosystem.

UNIT ATTRIBUTES

Predominant Species: WH/SS mixed Age Class: OG 200+

Acres by Volume Class:

Volume Class 4 (8-20 mbf/acre)

Unit Volume:

1,138 mbf Net Saw Saw/Util

46 Volume Class 5 (20-30 mbf/acre)

Volume/Acre (net Sawlog): 25 mbf

Volume Class 6 (30-50 mbf/acre)

Volume Class 7 (50+ mbf/acre)

Road Development: Specified Road Within Unit: 0 Miles; #'s _____
 Spur Road Within Unit: .1 Miles
 Landings: 2

RESOURCE CONCERN (C), MANAGEMENT OBJECTIVES (O), AND MITIGATION DIRECTION (D)Water Quality

- C: Channel stability of secondary channel along eastern boundary of Unit.
- O: Minimize the impacts of timber harvesting and road construction on the stream banks.
- D: Harvest only to the banks of the channel along the eastern and southeastern boundaries of the unit with SECONDARY PROTECTION. Stream channel within unit as splitline (BMP 13.16).

Wildlife

- C: Most of the unit is high value marten habitat.
- O:
- D: Not possible to mitigate.

Soils

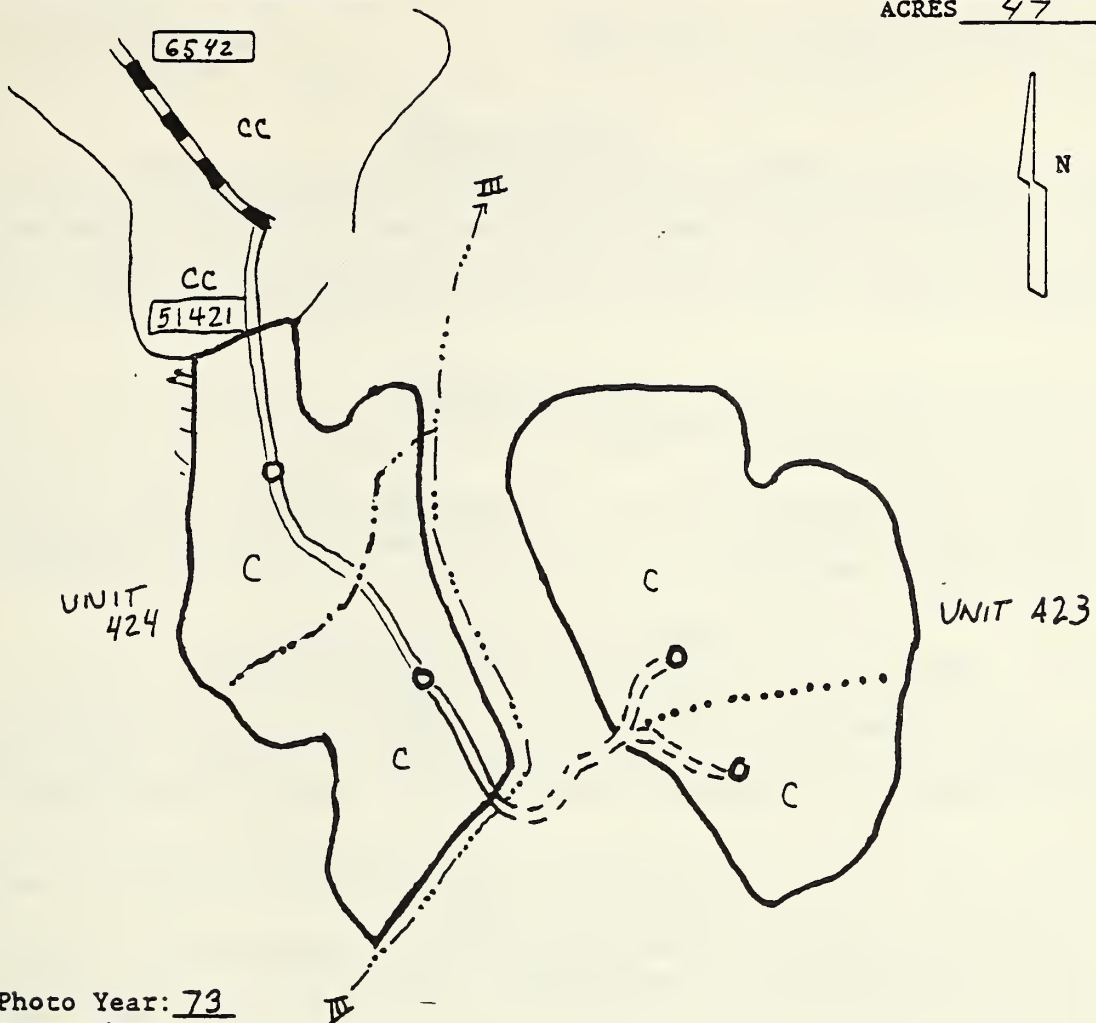
- C: Oversteepened slopes above western boundary of unit.
- O: Minimize the impacts of timber harvesting in these high hazard soil areas.
- D: Ensure that the unit boundary is located at the base of these oversteepened slopes.
 (BMP'S 13.2 & 13.3)

PROPOSED ACTION OR DEVELOPMENT

Stand will be highlead yarded. Splitline between CYL#1 and CYL#2 should be the Class III channel that divides the unit in half.

DESIRED FUTURE CONDITION

OBJ: Maximize wood fiber production while maintaining within stand diversity.
SITE PREP: none; REGEN: Natural; THIN: YEAR- ; SPACING- ; ROTATION: 100; I/D: none;
CONTROL: none; ENHAN: none; MONITORING: Year 3/5; CERT: 1997; OTHER COMMENTS: Monitor
effectiveness of maintaining channel bank stability during
reforestation reviews at year 3 and 5 post harvest. Note results of monitoring
on Monitoring Card.

Aerial Photo Year: 73Flight Line: 12Photo Number: 9

Legend

Approx. Map Scale: 1" = 660 ft.

	Unit Boundary				Suspension Required
	Internal Exclusion	/P			Partial (1 End)
	Specified Road	/F			Full (Both Ends)
	Existing			Setting Boundary
	Construction	(212)			Setting Number
	Reconstruction	CYL #1			Cable Yarder Landing
	Specified Road Number	HLT			Helicopter Landing
	Spur Road	(HLSW)			Truck Landing
	Log Transfer Facility				Saltwater Area
	Hydraulic Site (Bridge/Lg Culvert)				Streams
	Potential Rock Source	R.....			Watercourse
	Harvest System	I			Anadromous
C/	Cable	II			Resident
SH/	Shovel	III			Water Quality
Hec/	Helicopter (Clearcut)	R[.....]			Classification Limits
Heg/	Helicopter (Group Selection)	R.....			Primary Protection
T/	Tractor	R.....			Secondary Protection
cc	Existing Clearcut				Stream Buffer
Camp	Potential Camp				100' Minimum
SortY.	Potential Sortyard				Other Distance

TIMBER SALE: STARFISH (ETOLIN) UNIT SUMMARY UNIT NUMBER: 425
 Management Area S23 VCU 467 Compartment 244 Stand 812 Acres: 46

UNIT DEVELOPMENT

The original unit as delineated on the Unit Field Recon Card (11/90) and as presented in Alternative 4 (1/91) has been altered in design and increased in size by 30 acres. Water quality, fisheries, visual, wildlife habitat and soils concerns are addressed and mitigated. The alleviation of these concerns would facilitate the acceptable utilization of standing sawtimber and utility volume with no significant impact upon the forest ecosystem.

UNIT ATTRIBUTES

Predominant Species: WH/SS mixed Age Class: OG 200+

Acres by Volume Class:

46 Volume Class 4 (8-20 mbf/acre)
 Volume Class 5 (20-30 mbf/acre)
 Volume Class 6 (30-50 mbf/acre)
 Volume Class 7 (50+ mbf/acre)

Unit Volume:

1,391 mbf Net Saw Saw/Util
 Volume/Acre (net Sawlog): 30 mbf

Road Development: Specified Road Within Unit: .5 Miles; #'s 51581
 Spur Road Within Unit: 0 Miles
 Landings: 3

RESOURCE CONCERN (C), MANAGEMENT OBJECTIVES (O), AND MITIGATION DIRECTION (D)

Water Quality

- C: Channel stability of tributary (Class III stream along southeast boundary) in proximity to confluence with Wetbeck Creek.
- O: Minimize the impacts of timber harvesting on the streambanks.
- D: Utilize tributary as Unit boundary (BMP 13.16).
- C: Bank stability of tributary channel within unit.
- O: Minimize bank disturbance
- D: Splitline on tributary between landings 1 and 2 using directed felling into settings (BMP 13.16).

Soils

- C: Slope stability on till soils.
- O: Minimize soil disturbance and removal of thin organic layer
- D: PARTIAL SUSPENSION as possible downslope of road in all three settings. (BMP 13.9)

Fisheries

- C: Riparian protection of AHMU Class II stream (Wetbeck Creek).
- O: Minimize the impacts of timber harvesting on the fisheries habitat.
- D: Ensure minimum 100-foot buffer and PROVIDE PRIMARY PROTECTION.

Visual Quality

- C: The NE portion of the unit boundary is visible as middleground from head of Mosman Inlet. Previously harvested unit will add to the overall visual impact.
- O: Unit appearance should not cause greater visual impact than the inventoried VQO of "modification."
- D: Designate upper NE boundary to incorporate a narrow "finger" following the V-notch into the Unit (approximately 1 acre).

Wildlife

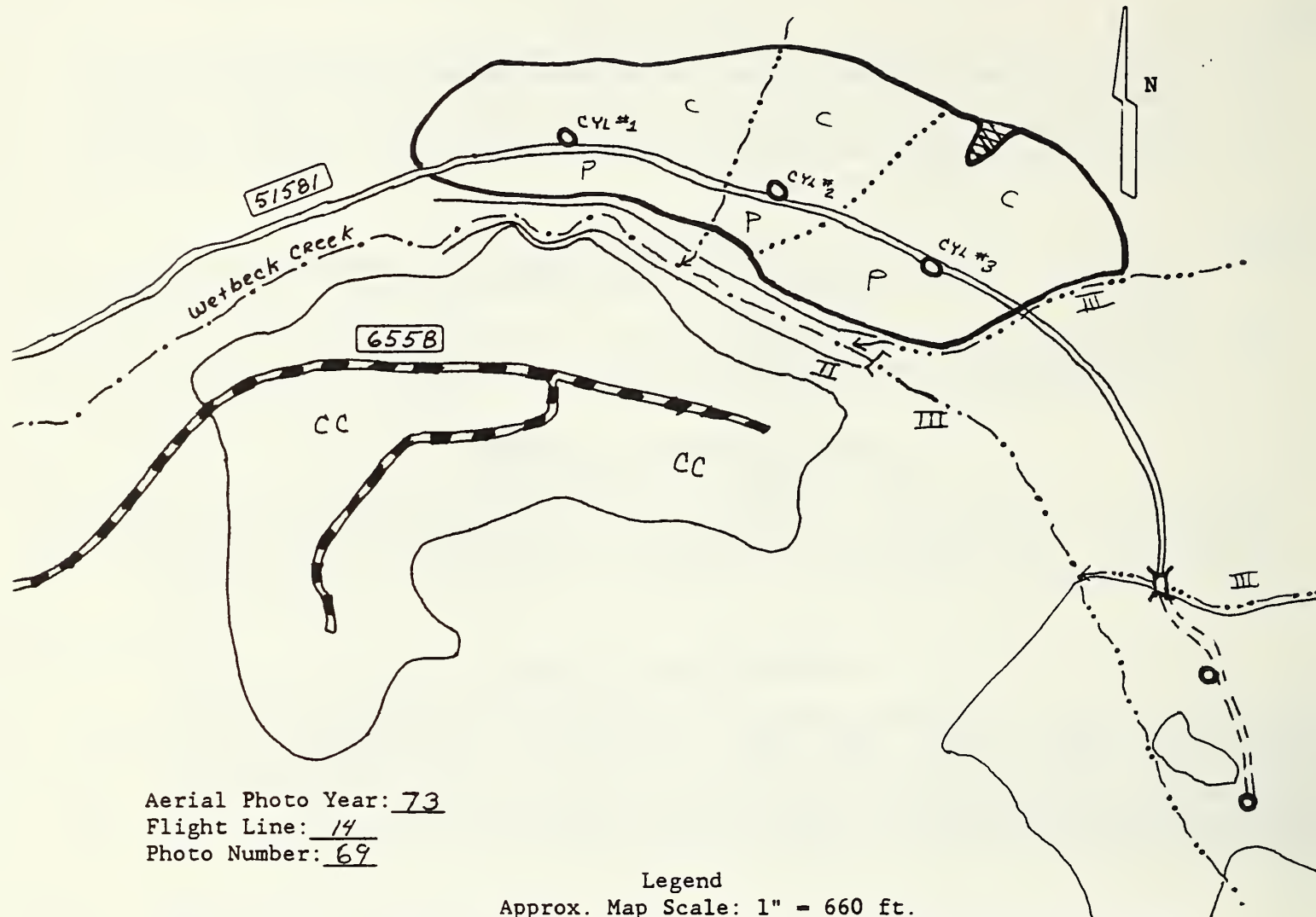
- C: Cumulative effects of harvest in vicinity upon deer, bear, upland landbirds, and furbearers. The unit has high value marten habitat and moderate value deer and bear habitat.
- O: Minimize the impacts of timber harvesting on wildlife habitat.
- D: Visuals and Water Quality adjustments mitigate many concerns. Not possible to totally mitigate loss of wildlife habitat.

PROPOSED ACTION OR DEVELOPMENT

Stand will be highlead yarded. A "finger" of timber will be retained in upper boundary of Unit following the V-notch into the Unit. A minimum 100-foot buffer will be retained along Wetbeck Creek. Unit boundary will run along the Class II stream in the S/SE portion of the Unit.

DESIRED FUTURE CONDITION

OBJ: Maximize wood fiber production while maintaining within-stand diversity.
 SITE PREP: none; REGEN: Natural; THIN: YEAR- ; SPACING- ; ROTATION: 100; I/D: none;
 CONTROL: none; ENHAN: none; MONITORING: Year 3/5; CERT: 1997; OTHER COMMENTS: Monitor effectiveness of maintaining channel bank stability during reforestation reviews at year 3 and 5 post harvest. Note results of monitoring on Monitoring Card.

Aerial Photo Year: 73Flight Line: 14Photo Number: 69

Legend

Approx. Map Scale: 1" = 660 ft.

	Unit Boundary		Suspension Required
	Internal Exclusion		Partial (1 End)
	Specified Road		Full (Both Ends)
	Existing		Setting Boundary
	Construction		Setting Number
	Reconstruction		Cable Yarder Landing
	Specified Road Number		Helicopter Landing
	Spur Road		Truck Landing
	Log Transfer Facility		Saltwater Area
	Hydraulic Site (Bridge/Lg Culvert)		Streams
	Potential Rock Source		Watercourse
	Harvest System		Anadromous
	Cable		Resident
	Shovel		Water Quality
	Helicopter (Clearcut)		Classification Limits
	Helicopter (Group Selection)		Primary Protection
	Tractor		Secondary Protection
	Existing Clearcut		Stream Buffer
	Potential Camp		100' Minimum
	Potential Sortyard		Other Distance

TIMBER SALE: STARFISH (ETOLIN) UNIT SUMMARY UNIT NUMBER: 426
 Management Area S23 VCU 467 Compartment 244 Stand 813 Acres: 46

UNIT DEVELOPMENT

The original unit as delineated on the Unit Field Recon Card (11/90) and as presented in Alternative 4 (1/91) comprised of settings 137, 136 and 135 has been altered in design. As a result of field inventories (4/91) the original settings 137 and 136 has been deleted. The specified road No. 51581 will not be built through the unit due to sensitive soils and geotechnical concerns. The specified road will be built on the north side of Wetbeck Creek to landings in settings 132 and 133 which will be included in the unit. A 3 acre muskeg inclusion west of the landigs will be excluded. This unit will be skylined-yarded across Wetbeck Creek. The harvest of standing sawtimber and utility volume is expected to have no significant impact upon the forest ecosystem if the following fisheries and soils concerns are addressed and mitigated.

UNIT ATTRIBUTES

Predominant Species: WH/SS mixed Age Class: OG 200+

Acres by Volume Class:

Volume Class 4 (8-20 mbf/acre)
46 Volume Class 5 (20-30 mbf/acre)
 Volume Class 6 (30-50 mbf/acre)
 Volume Class 7 (50+ mbf/acre)

Unit Volume:

1,387 mbf Net Saw Saw/Util
 Volume/Acre (net Sawlog): 30 mbf

Road Development: Specified Road Within Unit: .2 Miles; #'s 51581
 Spur Road Within Unit: Miles
 Landings: 2

RESOURCE CONCERN (C), MANAGEMENT OBJECTIVES (O), AND MITIGATION DIRECTION (D)Fisheries

- C: Secondary protection of AHMU Class III stream (Wetbeck Creek).
- O: Minimize the impacts of timber harvesting on the fisheries habitat.
- D: PROVIDE SECONDARY PROTECTION on that portion of Wetbeck Creek that runs through the unit.

Soils

- C: Soil stability
- O: Slope protection of deep till soils
- D: PARTIAL SUSPENSION as possible on NE aspect slopes before logs become FULLY SUSPENDED (BMP 13.9).

Water Quality

- C: Bank and riparian area porteciton of Class III channel
- O: Maintain bank protection and prevent bank disturbance
- D: Full suspension of logs across channel. Leave submerchantable riparian vegetation where possible. (BMP's 13.9 and 13.16) Provide secondary protection.

Wildlife

- C: Part of unit is high value marten habitat.
O:
D: Not possible to mitigate

PROPOSED ACTION OR DEVELOPMENT

Stand will be designed for running skyline yarding across Wetbeck Creek. Secondary protection will be required on Wetbeck Creek. The inventoried high-hazard soils have been field verified and deleted from unit by moving location of the unit boundary.

DESIRED FUTURE CONDITION

OBJ: Maximize wood fiber production while maintaining within stand diversity.
SITE PREP: none; REGEN: Natural; THIN: YEAR- ; SPACING- ; ROTATION: 100; I/D: none;
CONTROL: none; ENHAN: none; MONITORING: Year 3/5; CERT: 1997; OTHER COMMENTS: Monitor effectiveness of maintaining channel bank stability during reforestation reviews at year 3 and 5 post harvest. Note results of monitoring on Monitoring Card.

1

UNIT DESCRIPTIONTIMBER SALE: STARFISH (ETOLIN)Unit Number: 427TOTAL ACRES 182 HARVEST ACRES 27 VCU 464 Compartment 239 Stand 814DEVELOPMENT OF FINAL UNIT BOUNDARY

Planning Unit 427 as presented in Alternative 4 (1/91) will contain numerous group-selection cutting subunits of .5 to 3 acres in size each - for a total of 27 acres harvested. These values have been derived by estimating a harvest level of 15% of the area and, correspondingly, 15% of the volume within the Unit to be delineated during sale layout activities. The harvest and helicopter yarding of mature timber within this Unit will utilize standing sawtimber and utility volume in an environmentally acceptable manner while mitigating the following water quality concerns.

RESOURCE CONCERNS AND MITIGATIONRESOURCE CONCERN (C), MANAGEMENT OBJECTIVES (O), AND MITIGATION DIRECTION (D)

Water and Soil Quality

- C: Stability of V-notch slopes within Unit 427.
- O: Minimize soil disturbance
- D: Prevent the introduction of woody debris into V-notches.

Visuals Resource

- C: Area is visible as foreground from Anita Bay.
- O: Unit appearance should not cause greater visual impact than the inventoried VQO of partial retention.
- D: Ensure random distribution of groups. Shape of the majority groups should have longer dimension vertical in appearance (perpendicular to contours). Landscape architect should assist layout.

Wildlife Beach Fringe (0-500' in elevation)

- C: Beach fringe is high value habitat for deer, marten, eagles and otter. The 300' closest to saltwater most important to all except deer. DOCUMENTED EAGLE NEST REQUIRES 330' BUFFER.
- O: Minimize impacts to beach fringe, especially within 500' of saltwater. Design units to mimic natural gaps, providing forage while maintaining snow interception.
- D: No units within 500' of saltwater.
Units designed to minimize windthrow.
Units should be narrow and or amoeboid in shape; leave some large crowned trees standing if possible for snow interception.
NO HELICOPTER FLIGHTS WITHIN ONE QUARTER MILE OF ACTIVE EAGLE NEST FROM MAY 15 TO AUGUST 15 OR AS NEGOTIATED WITH U.S. Fish and Wildlife Service.

DESCRIPTION OF UNIT ATTRIBUTES/OBJECTIVES

Timber Attributes:

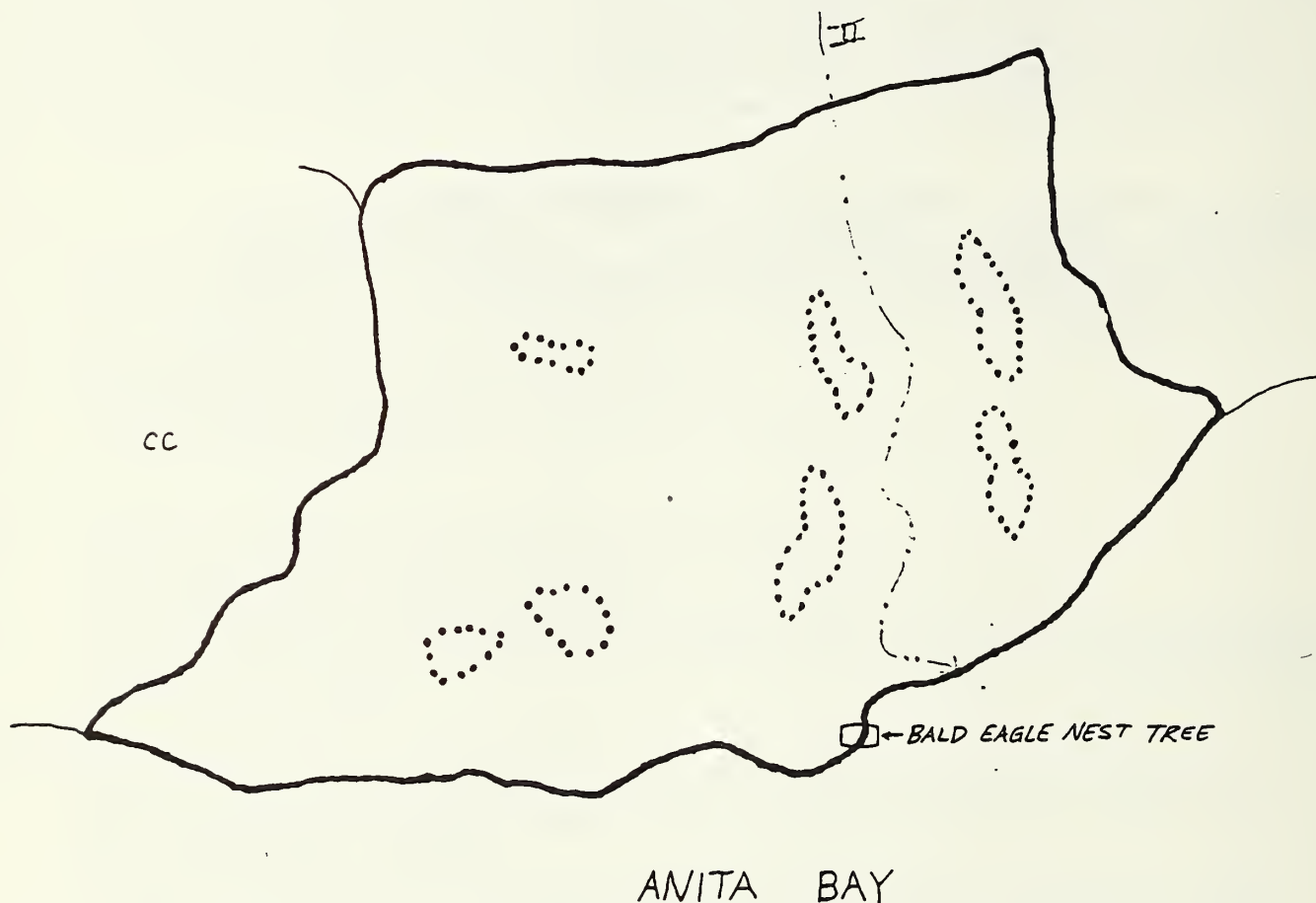
684 mbf Estimated total volume within the unit
25 mbf Estimated volume per acre for entire unit
 Acres by Volume Class within the unit:
 Volume Class 4 (8-20 mbf/acre)
 27 Volume Class 5 (20-30 mbf/acre)
 Volume Class 6 (30-50 mbf/acre)
 Volume Class 7 (50+ mbf/acre)

Stand Management Objectives: LUD IV Rotation Period: 100 years
 Regeneration Method: Natural Anticipated Treatments: Precommercial Thinning
 Other Considerations: Evaluate mistletoe potential.

UNIT NO. 427

The settings depicted here are meant only to represent the concept of layout. The actual location of settings will be determined in the field with the help of a Landscape Architect and a Wildlife Biologist.





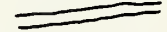
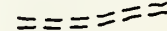






All settings are Heg









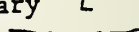
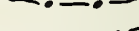
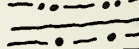


Approximate Drawing Scale:

1" = 660 feet (top of page is north)

Legend:

Planned Unit Boundary 
 Setting Boundary 
 Setting Number 
 Existing Road 
 Planned Spec. Road 
 Planned Temp. Road 
 Road Number 
 Permanent Bridge 
 Temporary Bridge 
 Landing 
 Existing Clearcut 
 Internal Exclusions 

Helicopter Yarding (clearcut) 
 Helicopter Yarding (group selection) 
 Cable Yarding 
 Full Suspension 
 Partial Suspension 
 Watercourse 
 AHMU Stream Classification 
 AHMU Stream Classification boundary 
 Watercourse-Primary Protection 
 Watercourse-Secondary Protection 
 Watercourse with 100-foot Buffer 

UNIT DESCRIPTIONTIMBER SALE: STARFISH (ETOLIN)Unit Number: 428TOTAL ACRES 16 HARVEST ACRES 3 VCU 464 Compartment 239 Stand 815DEVELOPMENT OF FINAL UNIT BOUNDARY

Planning Unit 428 as presented in Alternative 4 (1/91) will contain a few small group-selection cutting subunits of .5 to 3 acres in size each - for a total of 3 acres harvested. These values have been derived by estimating a harvest level of 15% of the area and, correspondingly, 15% of the volume within the Unit to be delineated during sale layout activities. The harvest and helicopter yarding of mature timber within this Unit will utilize standing sawtimber and utility volume in an environmentally acceptable manner while mitigating the following visual concerns.

RESOURCE CONCERNS AND MITIGATIONRESOURCE CONCERN (C), MANAGEMENT OBJECTIVES (O), AND MITIGATION DIRECTION (D)

Visuals

- C: Area is visible as foreground from Anita Bay.
 O: Ensure random-like distribution and natural shaping of subunits during layout to achieve the VQO of Retention.
 D: Landscape Architect should assist layout.

Wildlife

- C: Entire Unit is high value marten habitat.
 O:
 D: No mitigation possible.

DESCRIPTION OF UNIT ATTRIBUTES/OBJECTIVES

Timber Attributes:

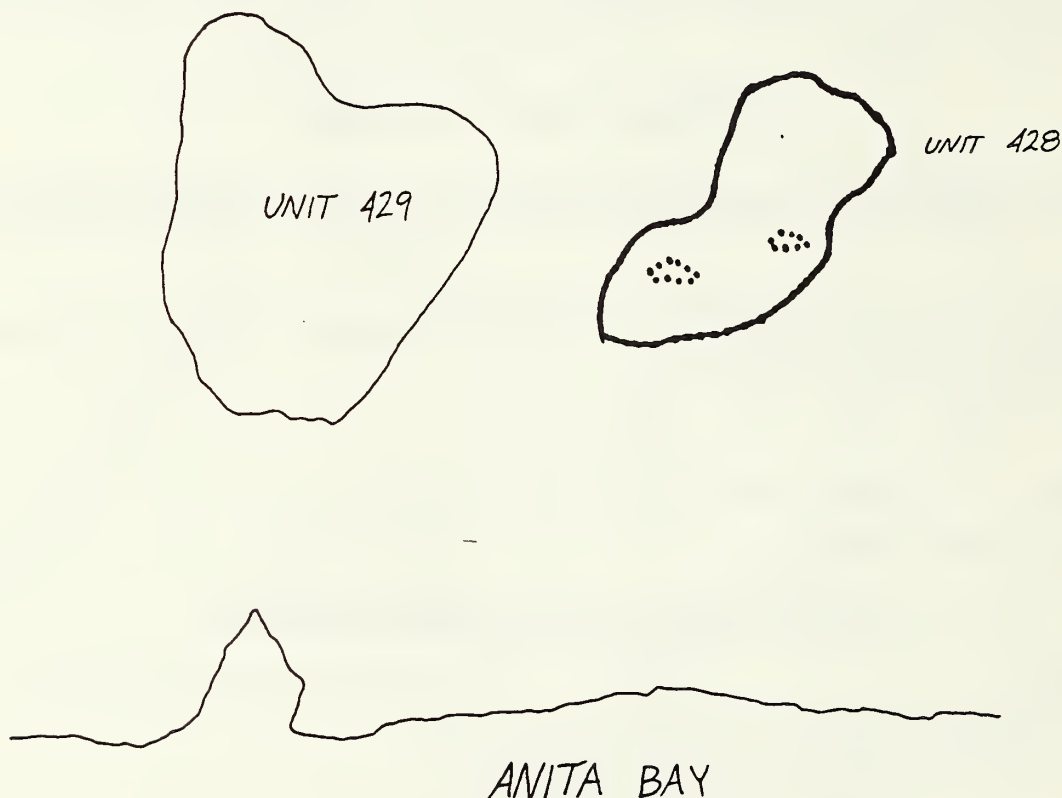
59 mbf Estimated total volume within the unit
25 mbf Estimated volume per acre for entire unit
 Acres by Volume Class within the unit:
 Volume Class 4 (8-20 mbf/acre)
 3 Volume Class 5 (20-30 mbf/acre)
 Volume Class 6 (30-50 mbf/acre)
 Volume Class 7 (50+ mbf/acre)

Stand Management Objectives: LUD IV Rotation Period: +100 years
 Regeneration Method: Natural Anticipated Treatments: Precommercial Thinning
 Other Considerations: Evaluate mistletoe potential

UNIT NO. 428






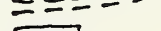






The settings depicted here are meant only to represent the concept of layout. The actual location of settings will be determined in the field with the help of a Landscape Architect and a Wildlife Biologist.









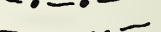
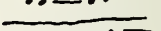

All settings are Heg



Approximate Drawing Scale: 1" = 660 feet (top of page is north)

Legend:

Planned Unit Boundary 
 Setting Boundary 
 Setting Number 
 Existing Road 
 Planned Spec. Road 
 Planned Temp. Road 
 Road Number 
 Permanent Bridge 
 Temporary Bridge 
 Landing 
 Existing Clearcut 
 Internal Exclusions 

Helicopter Yarding (clearcut) 
 Helicopter Yarding (group selection) 
 Cable Yarding 
 Full Suspension 
 Partial Suspension 
 Watercourse 
 AHMU Stream Classification 
 AHMU Stream Classification boundary 
 Watercourse-Primary Protection 
 Watercourse-Secondary Protection 
 Watercourse with 100-foot Buffer 

UNIT DESCRIPTIONTIMBER SALE: STARFISH (ETOLIN)Unit Number: 429TOTAL ACRES 36 HARVEST ACRES 5 VCU 464 Compartment 239 Stand 816DEVELOPMENT OF FINAL UNIT BOUNDARY

Planning Unit 429 as presented in Alternative 4 (1/91) will contain a few small group-selection cutting subunits of .5 to 3 acres in size each - for a total of 5 acres harvested. These values have been derived by estimating a harvest level of 15% of the area and, correspondingly, 15% of the volume within the Unit to be delineated during sale layout activities. The harvest and helicopter yarding of mature timber within this Unit will utilize standing sawtimber and utility volume in an environmentally acceptable manner while mitigating the following visual concerns.

RESOURCE CONCERNS AND MITIGATIONRESOURCE CONCERN (C), MANAGEMENT OBJECTIVES (O), AND MITIGATION DIRECTION (D)

Water and Soil

- C: Stability of V-notch slopes within Unit.
- O: Minimize slope disturbance.
- D: Do not harvest any trees on the slopes of any V-notch. Keep group selection units above V-notch slope breaks. Prevent the introduction of woody debris into V-notch and PROVIDE STREAM WITH SECONDARY PROTECTION. (BMP 13.16)

Visuals

- C: Area is visible as foreground from Anita Bay.
- O: Ensure random-like distribution and natural shaping of subunits during layout.
- D: Landscape Architect should accompany layout.

Wildlife

- C: Entire unit is high value marten habitat.
- O:
- D: No mitigation possible.

DESCRIPTION OF UNIT ATTRIBUTES/OBJECTIVES

Timber Attributes:

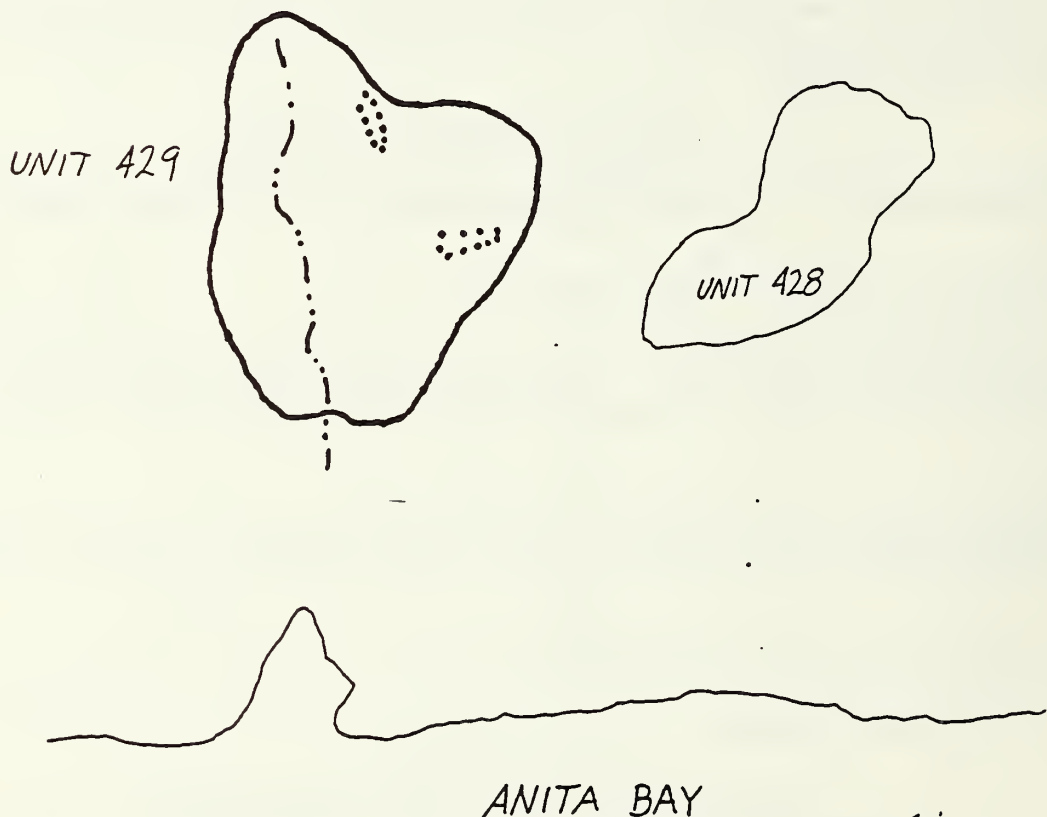
- 134 mbf Estimated total volume within the unit
- 25 mbf Estimated volume per acre for entire unit
- Acres by Volume Class within the unit:
 - Volume Class 4 (8-20 mbf/acre)
 - 5 Volume Class 5 (20-30 mbf/acre)
 - Volume Class 6 (30-50 mbf/acre)
 - Volume Class 7 (50+ mbf/acre)

Stand Management Objectives: LUD IV Rotation Period: +100 years
 Regeneration Method: Natural Anticipated Treatments: Precommercial Thinning
 Other Considerations: Evaluate mistletoe potential.

UNIT NO. 429





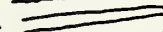
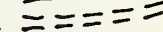






The settings depicted here are meant only to represent the concept of layout.
The actual location of settings will be determined in the field with the help
of a Landscape Architect and a Wildlife Biologist.









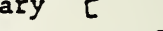
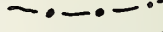

All settings are Heg



Approximate Drawing Scale: 1" = 660 feet (top of page is north)

Legend:

Planned Unit Boundary 
 Setting Boundary 
 Setting Number 
 Existing Road 
 Planned Spec. Road 
 Planned Temp. Road 
 Road Number 
 Permanent Bridge 
 Temporary Bridge 
 Landing 
 Existing Clearcut 
 Internal Exclusions 

Helicopter Yarding (clearcut) 
 Helicopter Yarding (group selection) 
 Cable Yarding 
 Full Suspension 
 Partial Suspension 
 Watercourse 
 AHMU Stream Classification 
 AHMU Stream Classification boundary 
 Watercourse-Primary Protection 
 Watercourse-Secondary Protection 
 Watercourse with 100-foot Buffer 

UNIT DESCRIPTIONTIMBER SALE: STARFISH (ETOLIN)Unit Number: 430ACRES 26 VCU 467 Compartment 244 Stand 817DEVELOPMENT OF FINAL UNIT BOUNDARY

The original 29 acre Unit as delineated on the Unit Layout Card dated 11/90 and as presented in Alternative 4 (1/91) has been altered in design and decreased in size by 6 acres. The following fisheries and water quality concerns would be mitigated while sawtimber and utility volume would be utilized.

RESOURCE CONCERNS AND MITIGATIONRESOURCE CONCERN (C), MANAGEMENT OBJECTIVES (O), AND MITIGATION DIRECTION (D)Fisheries/Water Quality

- C:
 O: Riparian protection of AHMU Class II stream (Pump Creek) and bank stability of class III channel transversing Unit.
 D: Ensure minimum 100' buffer along any verified Class II reaches (BMP 12.6). Provide secondary protection along class III channel (BMP 13.16).

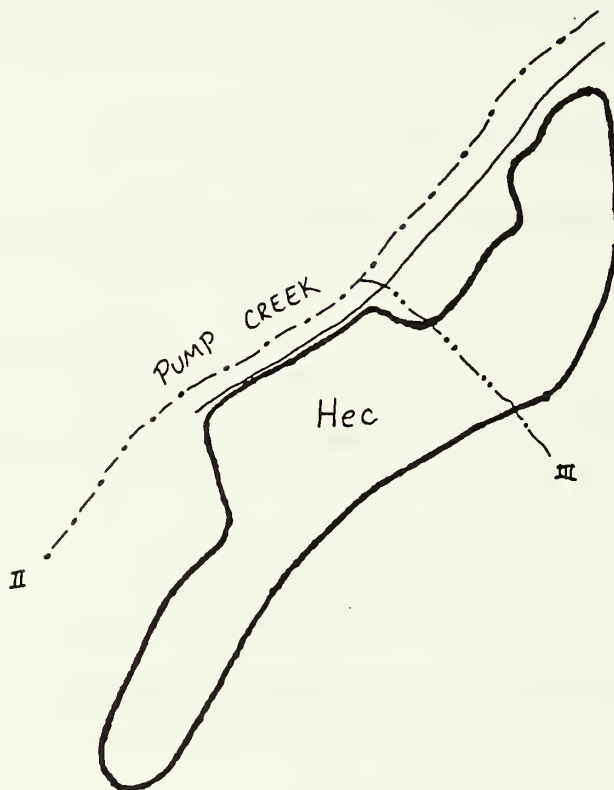
Wildlife

- C: High value otter habitat adjacent to Pump Creek.
 O: Maintain most of the high quality otter habitat.
 D: Maintenance of 100' buffer on Class II part of Pump Creek.

DESCRIPTION OF UNIT ATTRIBUTES/OBJECTIVESTimber Attributes:





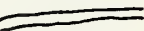
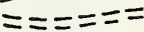






696 mbf Estimated total volume within the unit
29 mbf Estimated volume per acre for entire unit
 Acres by Volume Class within the unit:
 Volume Class 4 (8-20 mbf/acre)
 23 Volume Class 5 (20-30 mbf/acre)
 Volume Class 6 (30-50 mbf/acre)
 Volume Class 7 (50+ mbf/acre)









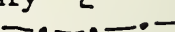

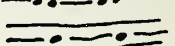
Stand Management Objectives: LUD III Rotation Period: +100 years
 Regeneration Method: Natural Anticipated Treatments: Precommercial Thinning
 Other Considerations: Evaluate mitletoe potential, consider whip felling if
warranted followed by artificial reforestation to spruce.

UNIT NO. 430

Approximate Drawing Scale: 1" = 660 feet (top of page is north)

Legend:

Planned Unit Boundary 
 Setting Boundary 
 Setting Number 
 Existing Road 
 Planned Spec. Road 
 Planned Temp. Road 
 Road Number 
 Permanent Bridge 
 Temporary Bridge 
 Landing 
 Existing Clearcut 
 Internal Exclusions 

Helicopter Yarding (clearcut) 
 Helicopter Yarding (group selection) 
 Cable Yarding 
 Full Suspension 
 Partial Suspension 
 Watercourse 
 AHMU Stream Classification 
 AHMU Stream Classification boundary 
 Watercourse-Primary Protection 
 Watercourse-Secondary Protection 
 Watercourse with 100-foot Buffer 

UNIT DESCRIPTIONTIMBER SALE: STARFISH (ETOLIN)Unit Number: 431ACRES 27 VCU 467 Compartment 244 Stand 814DEVELOPMENT OF FINAL UNIT BOUNDARY

The original 27-acre Unit as delineated on the Unit Layout Card dated 11/90 and as presented in Alternative 4 (1/91) has carried through to this point with no adjustments in design. The harvest and helicopter yarding of standing sawtimber and utility volume is expected to have no significant impact upon the forest ecosystem if the following fisheries concerns are addressed and mitigated.

RESOURCE CONCERNS AND MITIGATIONRESOURCE CONCERN (C), MANAGEMENT OBJECTIVES (O), AND MITIGATION DIRECTION (D)

Fisheries

C:

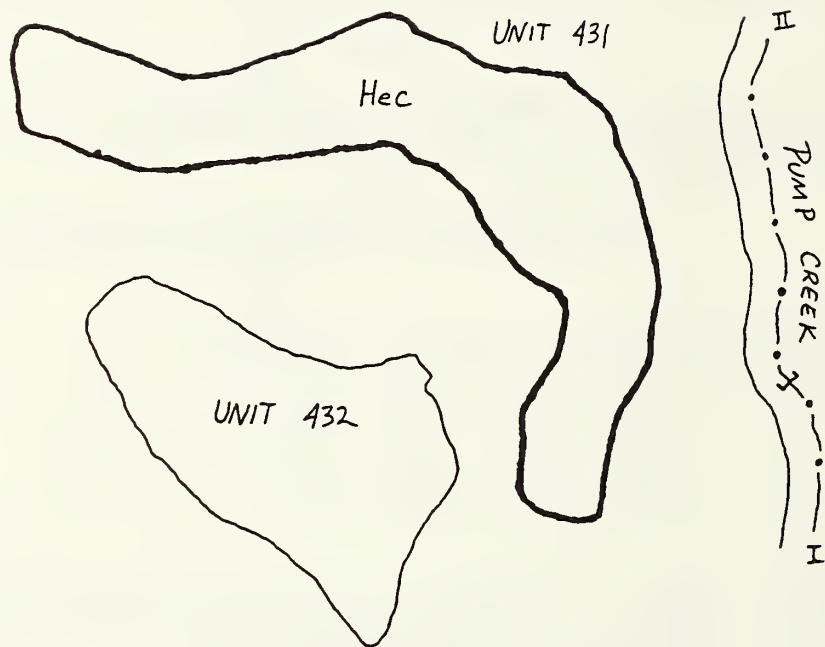
O: Riparian protection of AHMU Class II stream (Pump Creek).

D: Ensure minimum 100-foot buffer along any verified Class II reaches (BMP 12.6).
Include fisheries biologist in layout.DESCRIPTION OF UNIT ATTRIBUTES/OBJECTIVES

Timber Attributes:





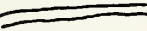
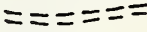






465 mbf Estimated total volume within the unit
17 mbf Estimated volume per acre for entire unit
 Acres by Volume Class within the unit:
 27 Volume Class 4 (8-20 mbf/acre)
 _____ Volume Class 5 (20-30 mbf/acre)
 _____ Volume Class 6 (30-50 mbf/acre)
 _____ Volume Class 7 (50+ mbf/acre)












Stand Management Objectives: LUD III Rotation Period: +100 years
 Regeneration Method: Natural Anticipated Treatments: Precommercial Thinning
 Other Considerations: Evaluate mitletoe potential, consider whip felling if
warranted followed by artificial reforestation to spruce.

UNIT NO. 431

Approximate Drawing Scale: 1" = 660 feet (top of page is north)

Legend:

Planned Unit Boundary 
 Setting Boundary 
 Setting Number 
 Existing Road 
 Planned Spec. Road 
 Planned Temp. Road 
 Road Number 
 Permanent Bridge 
 Temporary Bridge 
 Landing 
 Existing Clearcut 
 Internal Exclusions 

Helicopter Yarding (clearcut) 
 Helicopter Yarding (group selection) 
 Cable Yarding 
 Full Suspension 
 Partial Suspension 
 Watercourse 
 AHMU Stream Classification 
 AHMU Stream Classification boundary 
 Watercourse-Primary Protection 
 Watercourse-Secondary Protection 
 Watercourse with 100-foot Buffer 

UNIT DESCRIPTIONTIMBER SALE: STARFISH (ETOLIN)Unit Number: 432ACRES 23VCU 467Compartment 244Stand 815DEVELOPMENT OF FINAL UNIT BOUNDARY

The original 23-acre Unit as delineated on the Unit Layout Card dated 11/90 and as presented in Alternative 4 (1/91) has carried through to this point with no adjustments in design. The harvest and helicopter yarding of standing sawtimber and utility volume is expected to have no significant impact upon the forest ecosystem if the following fisheries and water quality concerns are addressed and mitigated.

RESOURCE CONCERNS AND MITIGATIONRESOURCE CONCERN (C), MANAGEMENT OBJECTIVES (O), AND MITIGATION DIRECTION (D)

Fisheries/Water Quality

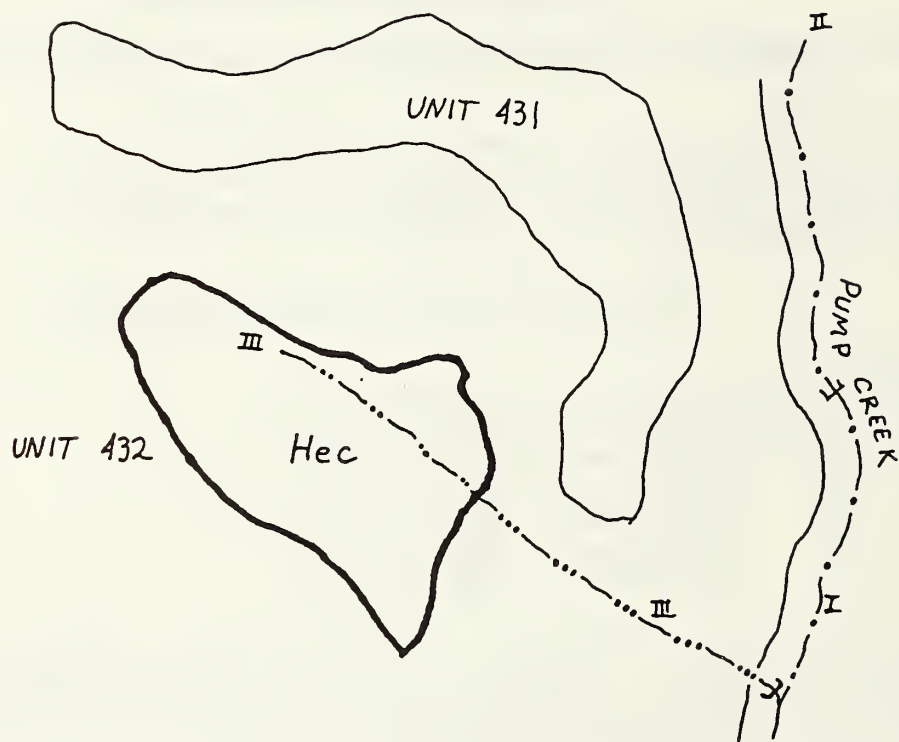
- C: Channel/bank stability of Class III tributary.
 O: Minimize bank disturbance and debris loading in channel
 D: Provide secondary protection to Class III channel (BMP 13.16).
 Include fisheries biologist in layout.

DESCRIPTION OF UNIT ATTRIBUTES/OBJECTIVES

Timber Attributes:





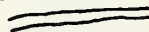
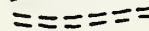






<u>389 mbf</u>	Estimated total volume within the unit
<u>17 mbf</u>	Estimated volume per acre for entire unit
Acres by Volume Class within the unit:	
<u>23</u>	Volume Class 4 (8-20 mbf/acre)
<u> </u>	Volume Class 5 (20-30 mbf/acre)
<u> </u>	Volume Class 6 (30-50 mbf/acre)
<u> </u>	Volume Class 7 (50+ mbf/acre)









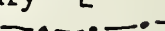
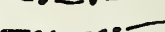
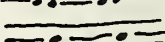
Stand Management Objectives: LUD III Rotation Period: +100 years
 Regeneration Method: Natural Anticipated Treatments: Precommercial Thinning
 Other Considerations: Evaluate mistletoe potential, consider whip felling if
warranted followed by artificial reforestation to spruce.

UNIT NO. 432

Approximate Drawing Scale: 1" = 660 feet (top of page is north)

Legend:

Planned Unit Boundary 
 Setting Boundary 
 Setting Number 
 Existing Road 
 Planned Spec. Road 
 Planned Temp. Road 
 Road Number 
 Permanent Bridge 
 Temporary Bridge 
 Landing 
 Existing Clearcut CC 
 Internal Exclusions 

Helicopter Yarding (clearcut) 
 Helicopter Yarding (group selection) 
 Cable Yarding 
 Full Suspension 
 Partial Suspension 
 Watercourse 
 AHMU Stream Classification 
 AHMU Stream Classification boundary 
 Watercourse-Primary Protection 
 Watercourse-Secondary Protection 
 Watercourse with 100-foot Buffer 

UNIT DESCRIPTIONTIMBER SALE: STARFISH (ETOLIN)Unit Number: 433ACRES 98 VCU 467 Compartment 244 Stand 816DEVELOPMENT OF FINAL UNIT BOUNDARY

The original 98 acre Unit as delineated on the Unit Layout Card dated 11/90 and as presented in Alternative 4 (1/91) has carried through to this point with no adjustments in design. The harvest and helicopter yarding of standing sawtimber and utility volume is expected to have no significant impact upon the forest ecosystem if the following visual, water quality, and soils concerns are addressed and mitigated.

RESOURCE CONCERNS AND MITIGATIONRESOURCE CONCERN (C), MANAGEMENT OBJECTIVES (O), AND MITIGATION DIRECTION (D)Soils

- C: As planned unit contains some inventories high hazard soils (see map).
- O: Avoid harvesting timber on high hazard soils.
- D: Soil scientist should accompany layout. Any confirmed high hazard soils shall be avoided through modification of the unit boundary (BMP 13.2, 13.5)

Water Quality

- C: Increase risk of debris flows in high gradient channels.
- O: Stability of the five tributaries delineated on map.
- D: In order to prevent additional, unnatural debris jams from developing, PROVIDE SECONDARY PROTECTION TO THESE TRIBUTARIES (BMP 13.16).

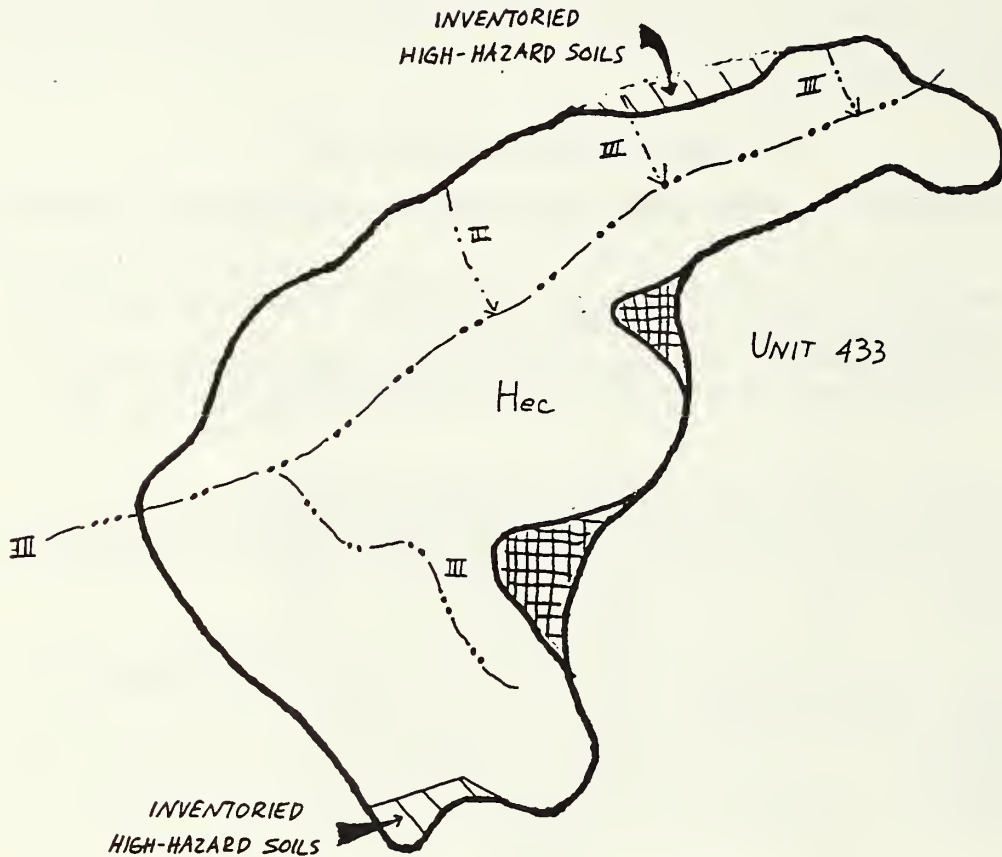
Visuals

- C: Unit is visible as Middleground from Mosman Inlet. Previously harvested units will add to the overall impact.
- O: uNit appearance should not cause greater visual impact than the inventoried VQO of Modification.
- D: East boundary will be modified and laid out with fingers in order to appear irregular.

DESCRIPTION OF UNIT ATTRIBUTES/OBJECTIVESTimber Attributes:

2,448 mbf Estimated total volume within the unit
25 mbf Estimated volume per acre for entire unit
 Acres by Volume Class within the unit:
 Volume Class 4 (8-20 mbf/acre)
 98 Volume Class 5 (20-30 mbf/acre)
 Volume Class 6 (30-50 mbf/acre)
 Volume Class 7 (50+ mbf/acre)

Stand Management Objectives: LUD III Rotation Period: +100 years
 Regeneration Method: Natural Anticipated Treatments: Precommercial Thinning
 Other Considerations: Evaluate mistletoe potential, consider whip felling if
warranted followed by artificial reforestation to spruce.

UNIT NO. 433

Approximate Drawing Scale:

1" = 660 feet (top of page is north)

Legend:

Planned Unit Boundary
 Setting Boundary
 Setting Number
 Existing Road
 Planned Spec. Road
 Planned Temp. Road
 Road Number
 Permanent Bridge
 Temporary Bridge
 Landing
 Existing Clearcut
 Internal Exclusions

Helicopter Yarding (clearcut)
 Helicopter Yarding (group selection)
 Cable Yarding
 Full Suspension
 Partial Suspension
 Watercourse
 AHMU Stream Classification
 AHMU Stream Classification boundary
 Watercourse-Primary Protection
 Watercourse-Secondary Protection
 Watercourse with 100-foot Buffer

UNIT DESCRIPTIONTIMBER SALE: STARFISH (ETOLIN)Unit Number: 434ACRES 27VCU 464Compartment 239Stand 820DEVELOPMENT OF FINAL UNIT BOUNDARY

The original 27 acre Unit as delineated on the Unit Layout Card dated 11/90 and as presented in Alternative 4 (1/91) has carried through to this point with no adjustments in design. The harvest and helicopter yarding of standing sawtimber and utility volume is expected to have no significant impact upon the forest ecosystem if the following fisheries and soils concerns are addressed and mitigated.

RESOURCE CONCERNS AND MITIGATIONRESOURCE CONCERN (C), MANAGEMENT OBJECTIVES (O), AND MITIGATION DIRECTION (D)

Soils

- C: The planned Unit contains some inventoried high-hazard soils (see map).
- O: Avoid harvesting timber on high-hazard soils.
- D: Any high-hazard soils shall be deleted from harvest. Layout unit backline such that excessively steep slopes (>75%) are avoided by bringing the backline down slope (BMP 13.2, 13.5).

Water Quality

- C: Increased risk or mass wasting in V-notch and other high gradient channels.
- O: Maintain channel and side slope stability of mapped and any unmappable class III channels.
- D: In order to prevent additional unnatural debris jams from developing, provide secondary protection for the class III channels greater than 3' wide within the unit (BMP 13.16).

Fisheries

- C: Riparian protection of AHMU Class II stream (Duckbill Creek).
- D: Ensure 100' buffer along both sides any Class II reaches.

Wildlife

- C: Western two thirds of unit is high value marten habitat. Area adjacent to Duckbill Creek is high value otter habitat.
- O: Maintain high value otter habitat.
- D: Maintenance of 100' buffer along Class II reaches will to protect most of the otter habitat. Not possible to mitigate loss of marten habitat.

DESCRIPTION OF UNIT ATTRIBUTES/OBJECTIVES

Timber Attributes:

804 mbf Estimated total volume within the unit
30 mbf Estimated volume per acre for entire unit



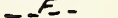











Acres by Volume Class within the unit:

_____ Volume Class 4 (8-20 mbf/acre)
27 Volume Class 5 (20-30 mbf/acre)
_____ Volume Class 6 (30-50 mbf/acre)
_____ Volume Class 7 (50+ mbf/acre)

Stand Management Objectives: LUD IV Rotation Period: +100 years
Regeneration Method: Natural Anticipated Treatments: Precommercial Thinning
Other Considerations: Evaluate mistletoe potential, consider whip felling if
warranted followed by artificial reforestation to spruce.

UNIT NO. 434

A hand-drawn map of the Hec area. The map shows a large irregular shape labeled "Hec" in the center. To the left of Hec is a smaller area labeled "UNIT 434". To the right of Hec is a large area labeled "UNIT 435". At the bottom of the map is a line labeled "DUCKBILL CREEK". Above the creek, there are several areas marked with Roman numerals and labels: "INVENTORIED HIGH-HAZARD SOILS" with an arrow pointing to a hatched area, "III" with an arrow pointing to a dashed line, "II" with an arrow pointing to a dotted line, and "III" with an arrow pointing to a solid line. There is also a label "recent mass wasting" with an arrow pointing to a hatched area at the bottom left. The map is drawn on a grid of dots.

Planned Unit Boundary		Helicopter Yarding (clearcut)	<i>Hec</i>
Setting Boundary	Helicopter Yarding (group selection)	<i>Heg</i>
Setting Number	(316)	Cable Yarding	C
Existing Road		Full Suspension	
Planned Spec. Road		Partial Suspension	
Planned Temp. Road		Watercourse	
Road Number	6272	AHMU Stream Classification	III
Permanent Bridge		AHMU Stream Classification boundary	[
Temporary Bridge		Watercourse-Primary Protection	
Landing		Watercourse-Secondary Protection	
Existing Clearcut	CC	Watercourse with 100-foot Buffer	
Internal Exclusions			

UNIT DESCRIPTIONTIMBER SALE: STARFISH (ETOLIN)Unit Number: 435ACRES 47 VCU 464 Compartment 239 Stand 821DEVELOPMENT OF FINAL UNIT BOUNDARY

The original 47 acre Unit as delineated on the Unit Layout Card dated 11/90 and as presented in Alternative 4 (1/91) has carried through to this point with no adjustments in design. The harvest and helicopter yarding of standing sawtimber and utility volume is expected to have no significant impact upon the forest ecosystem if the following fisheries, water quality, and soils concerns are addressed and mitigated.

RESOURCE CONCERNS AND MITIGATIONRESOURCE CONCERN (C), MANAGEMENT OBJECTIVES (O), AND MITIGATION DIRECTION (D)

Soils

- C: Slope stability.
- O: Minimize soil and slope disturbance.
- D: Do not harvest tress below the slope break where bench landform meets steep valley wall of stream. This may require greater than a 100' buffer along the class II channel. Likewise lay back line of unit on the slope bench above the bench below a point where slopes become consistently 75% or greater (BMP 13.5)

Fisheries and Water Quality

- C: Riparian protection of AHMU Class II stream (Duckbill Creek) and the stability of banks in V-notch delineated on map.
- M: Ensure 100' buffer along both sides of Class II stream. In order to prevent additional, unnatural debris jams from developing, provide secondary protection for the channel within the Unit (BMP 13.15).

Wildlife

- C: High value otter habitat adjacent to Duckbill Creek.
- O: Maintain most of high value otter habitat.
- D: Maintainance of 100' buffer along Class II reaches of Duckbill Creek, will protect most of the otter habitat.

DESCRIPTION OF UNIT ATTRIBUTES/OBJECTIVES

Timber Attributes:

<u>1,402 mbf</u>	Estimated total volume within the unit
<u>30 mbf</u>	Estimated volume per acre for entire unit

Acres by Volume Class within the unit:

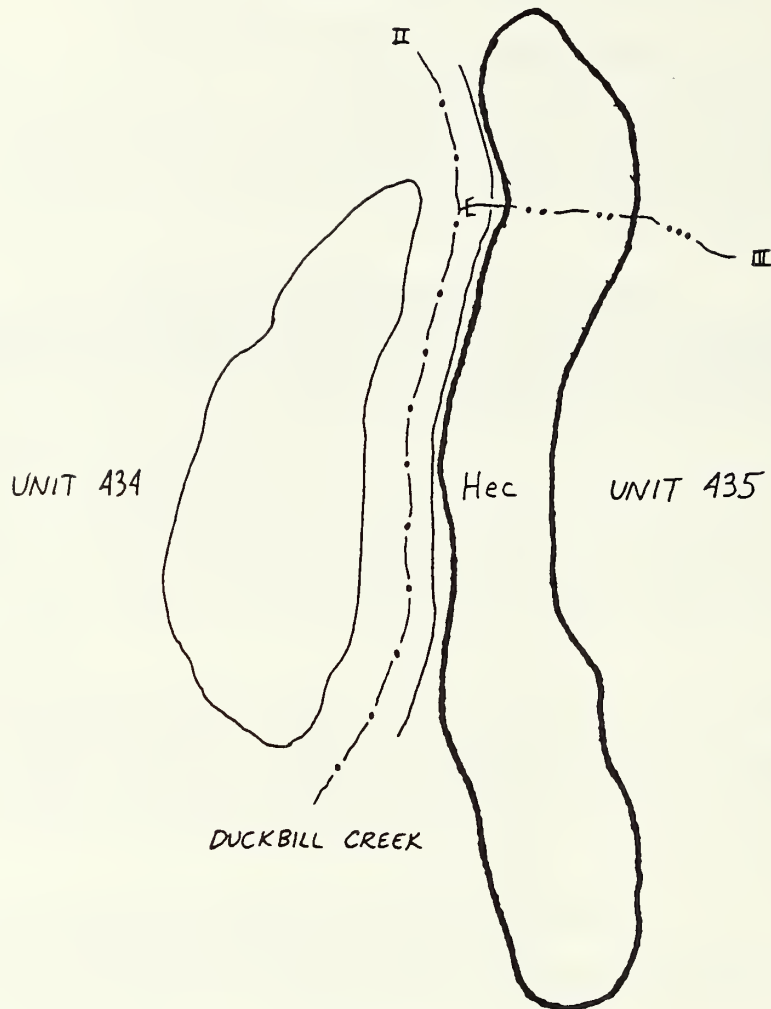
Volume Class 4 (8-20 mbf/acre)

47 Volume Class 5 (20-30 mbf/acre)





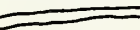
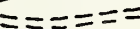






Volume Class 6 (30-50 mbf/acre)











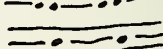
Volume Class 7 (50+ mbf/acre)

Stand Management Objectives: LUD IV Rotation Period: +100 years
Regeneration Method: Natural Anticipated Treatments: Precommercial Thinning
Other Considerations: Evaluate mistletoe potential, consider whip felling if warranted followed by artificial reforestation to spruce.

UNIT NO. 435Approximate Drawing Scale: 1" = 660 feet (top of page is north)

Legend:

Planned Unit Boundary 
 Setting Boundary 
 Setting Number 
 Existing Road 
 Planned Spec. Road 
 Planned Temp. Road 
 Road Number 
 Permanent Bridge 
 Temporary Bridge 
 Landing 
 Existing Clearcut 
 Internal Exclusions 

Helicopter Yarding (clearcut) 
 Helicopter Yarding (group selection) 
 Cable Yarding 
 Full Suspension 
 Partial Suspension 
 Watercourse 
 AHMU Stream Classification 
 AHMU Stream Classification boundary 
 Watercourse-Primary Protection 
 Watercourse-Secondary Protection 
 Watercourse with 100-foot Buffer 

UNIT DESCRIPTIONTIMBER SALE: STARFISH (ETOLIN)Unit Number: 436TOTAL ACRES 97 HARVEST ACRES 15 VCU 468 Compartment 245 Stand 801DEVELOPMENT OF FINAL UNIT BOUNDARY

Planning Unit 436 as presented in Alternative 4 (1/91) will contain numerous group-selection cutting subunits of .5 to 3 acres in size each - for a total of 15 acres harvested. These values have been derived by estimating a harvest level of 15% of the area and, correspondingly, 15% of the volume within the Unit to be delineated during sale layout activities. The harvest and helicopter yarding of mature timber within this Unit will utilize standing sawtimber and utility volume in an environmentally acceptable manner while mitigating the following visual, fisheries, water quality, and soils concerns.

RESOURCE CONCERNS AND MITIGATIONRESOURCE CONCERN (C), MANAGEMENT OBJECTIVES (O), AND MITIGATION DIRECTION (D)

Soils

- C: The Unit contains some inventoried high hazard soils.
- O: Do not harvest on oversteepened slopes.
- D: Do not harvest sub units on slopes greater than 75% slope (BMP 13.5)

Fisheries/Water Quality

- C:
- O: Riparian protection of AHMU Class II stream within Unit.
- D: Ensure 100' buffer along class II channel and secondary protection along upper reaches of this channel (BMP 12.6, 13.16). Keep units above any V-notch slope breaks no sideslope harvesting.

Visuals

- C: Area is visible as middleground from Burnett Inlet.
- O: Unit appearance should not cause greater impact than the inventoried VQO of Modification and will likely meet the VQO of Partial Retention.
- D: Ensure random-like distribution and natural shaping of subunits during layout.

Wildlife

- C: High value otter habitat adjacent to Class II part of stream and entire unit is high value marten habitat.
- O: Maintain most of high value otter habitat, minimize affects of clearcuts on marten habitat.
- D: Maintainance of 100' buffer on Class II sections of stream will protect most if the otter habitat. Keep group selection units small narrow, and irregular in shape to lessen impact on marten.

DESCRIPTION OF UNIT ATTRIBUTES/OBJECTIVES

Timber Attributes:

435 mbf Estimated total volume within the unit
29 mbf Estimated volume per acre for entire unit

Acres by Volume Class within the unit:

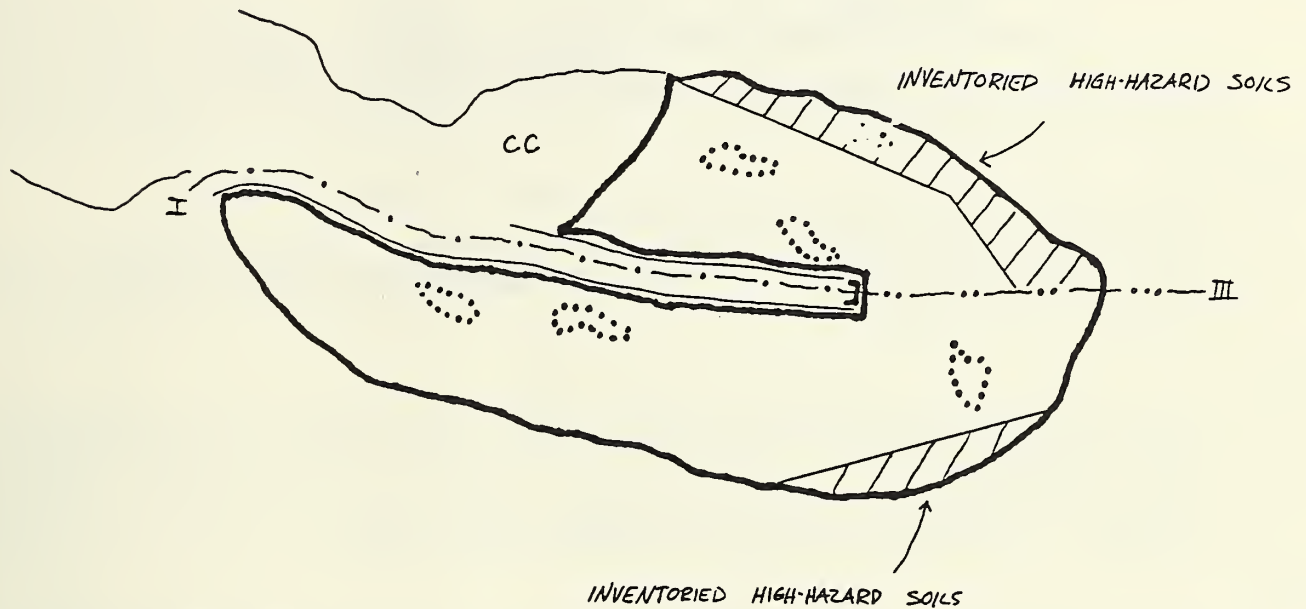
_____ Volume Class 4 (8-20 mbf/acre)
15 Volume Class 5 (20-30 mbf/acre)
_____ Volume Class 6 (30-50 mbf/acre)
_____ Volume Class 7 (50+ mbf/acre)

Stand Management Objectives: LUD III Rotation Period: +100 yearsRegeneration Method: Natural Anticipated Treatments: Precommercial ThinningOther Considerations: Evaluate mistletoe potential.

UNIT NO. 436

The settings depicted here are meant only to represent the concept of layout. The actual location of settings will be determined in the field with the help of a Landscape Architect and a Wildlife Biologist.





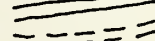
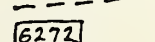






All settings are Heg






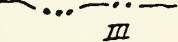


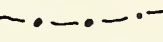

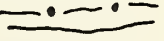


Approximate Drawing Scale:

1" = 660 feet (top of page is north)

Legend:

Planned Unit Boundary 
 Setting Boundary 
 Setting Number 
 Existing Road 
 Planned Spec. Road 
 Planned Temp. Road 
 Road Number 
 Permanent Bridge 
 Temporary Bridge 
 Landing 
 Existing Clearcut 
 Internal Exclusions 

Helicopter Yarding (clearcut) 
 Helicopter Yarding (group selection) 
 Cable Yarding 
 Full Suspension 
 Partial Suspension 
 Watercourse 
 AHMU Stream Classification 
 AHMU Stream Classification boundary 
 Watercourse-Primary Protection 
 Watercourse-Secondary Protection 
 Watercourse with 100-foot Buffer 

UNIT DESCRIPTIONTIMBER SALE: STARFISH (ETOLIN)Unit Number: 437TOTAL ACRES 45 HARVEST ACRES 7 VCU 464 Compartment 239 Stand 817DEVELOPMENT OF FINAL UNIT BOUNDARY

Planning Unit 437 as presented in Alternative 4 (1/91) will contain a few small group-selection cutting subunits of .5 to 3 acres in size each - for a total of 7 acres harvested. These values have been derived by estimating a harvest level of 15% of the area and, correspondingly, 15% of the volume within the Unit to be delineated during sale layout activities. The harvest and helicopter yarding of mature timber within this Unit will utilize standing sawtimber and utility volume in an environmentally acceptable manner while mitigating the following visual, wildlife, and water quality concerns.

RESOURCE CONCERNS AND MITIGATIONRESOURCE CONCERN (C), MANAGEMENT OBJECTIVES (O), AND MITIGATION DIRECTION (D)

Water Quality

- C: Channel and bank stability of channel in eastern portion of Unit.
- O: Minimize bank and sideslope disturbance.
- D: Do not harvest any trees on the slope of the V-notch. Keep subunits above slope break. (BMP 13.2). PROVIDE SECONDARY PROTECTION as needed on other reaches of this channel (BMP 13.16)

Visuals

- C: Area is visible as foreground from Anita Bay.
- O: Unit appearance should not cause greater visual impact than the inventoried VQO of Partial Retention.
- D: Ensure random-like distribution of groups. Shape units horizontally (parallel to the contours). Landscape architect will assist with layout.

Wildlife

- C: Two confirmed eagle nest trees near unit, may be others. Helicopter activity could adversely affect nesting eagles. Entire unit is high value marten habitat.
- O: Minimize adverse affect on marten habitat and nesting eagles.
- D: Confirm existence and location of eagle nest trees and look for new ones. ESTABLISH AND MAINTAIN 330' BUFFER. NO HELICOPTER ACTIVITY WITHIN 1/4 MILE OF ACTIVE NESTS FROM MAY 15 TO AUG 15 OR AS NEGOTIATED WITH U. S. FISH AND WILDLIFE SERVICE. Keep group selection units small, narrow and irregular in shape to minimize impacts on marten. Establish yarding corridors and timing restrictions to protect nesting eagles. A wildlife biologist should assist layout.

DESCRIPTION OF UNIT ATTRIBUTES/OBJECTIVES

Timber Attributes:

169 mbf Estimated total volume within the unit
25 mbf Estimated volume per acre for entire unit

Acres by Volume Class within the unit:

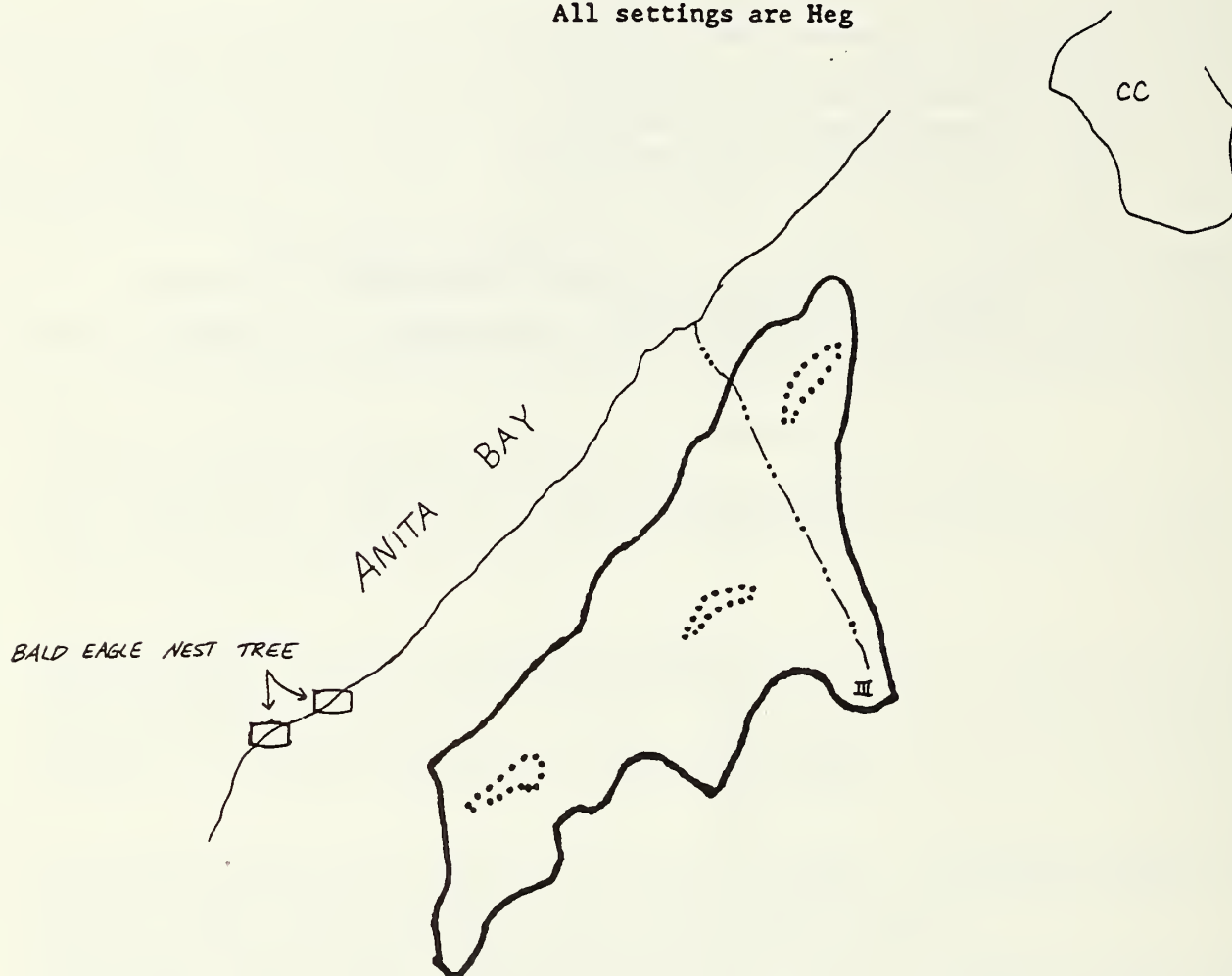
_____ Volume Class 4 (8-20 mbf/acre)
7 Volume Class 5 (20-30 mbf/acre)
_____ Volume Class 6 (30-50 mbf/acre)
_____ Volume Class 7 (50+ mbf/acre)

Stand Management Objectives: LUD IV Rotation Period: +100 years
Regeneration Method: Natural Anticipated Treatments: Precommercial Thinning
Other Considerations: Evaluate mistletoe potential

UNIT NO. 437

The settings depicted here are meant only to represent the concept of layout. The actual location of settings will be determined in the field with the help of a Landscape Architect and a Wildlife Biologist.





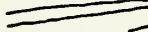
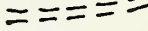






All settings are Heg









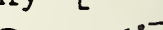
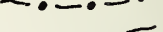
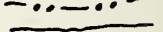


Approximate Drawing Scale:

1" = 660 feet (top of page is north)

Legend:

Planned Unit Boundary 
 Setting Boundary 
 Setting Number 
 Existing Road 
 Planned Spec. Road 
 Planned Temp. Road 
 Road Number 
 Permanent Bridge 
 Temporary Bridge 
 Landing 
 Existing Clearcut 
 Internal Exclusions 

Helicopter Yarding (clearcut) 
 Helicopter Yarding (group selection) 
 Cable Yarding 
 Full Suspension 
 Partial Suspension 
 Watercourse 
 AHMU Stream Classification 
 AHMU Stream Classification boundary 
 Watercourse-Primary Protection 
 Watercourse-Secondary Protection 
 Watercourse with 100-foot Buffer 

UNIT DESCRIPTIONTIMBER SALE: STARFISH (ETOLIN)Unit Number: 438TOTAL ACRES 86 HARVEST ACRES 13 VCU 464 Compartment 239 Stand 818DEVELOPMENT OF FINAL UNIT BOUNDARY

Planning Unit 438 as presented in Alternative 4 (1/91) will contain numerous group-selection cutting subunits of .5 to 3 acres in size each - for a total of 13 acres harvested. These values have been derived by estimating a harvest level of 15% of the area and, correspondingly, 15% of the volume within the Unit to be delineated during sale layout activities. The harvest and helicopter yarding of mature timber within this Unit will utilize standing sawtimber and utility volume in an environmentally acceptable manner while mitigating the following visual, water quality, and wildlife habitat concerns.

RESOURCE CONCERNS AND MITIGATIONRESOURCE CONCERN (C), MANAGEMENT OBJECTIVES (O), AND MITIGATION DIRECTION (D)

Water and Soil Quality

- C: Channel and bank stability of Class III streams within unit and on the unit boundary.
- O: Minimize disturbance and subsequent increased risk of mass failures.
- D: Avoid locating groups selection subunits on any V-notch sideslopes, or where slopes exceed 75%. PROVIDE SECONDARY PROTECTION ON REACHES WHERE SUBUNITS MAY AFFECT INTEGRITY OF THE CHANNEL (BMP 13.2 13.16).

Visuals

- C: Area is visible as foreground from Anita Bay.
- O: Should achieve the VQO of Retention.
- D: Ensure random-like distribution of groups. Shape of subunits should be narrow and run perpendicular to the contours. Landscape Architect will assist layout.

Wildlife

- C: Several confirmed eagle nest trees within or near unit, may be others. Helicopter activity could adversely affect nesting eagles. Entire unit is high value marten habitat.
- O: Minimize adverse affect on marten habitat and nesting eagles.
- D: Confirm existence and location of eagle nest trees and look for new ones. ESTABLISH AND MAINTAIN 330' BUFFER. NO HELICOPTER ACTIVITY WITHIN 1/4 MILE OF ACTIVE NESTS FROM MAY 15 TO AUG 15 OR AS NEGOTIATED WITH U. S. FISH AND WILDLIFE SERVICE. Keep group selection units small, narrow and irregular in shape to minimize impacts on marten habitat. Establish yarding corridors and timing restrictions to protect nesting eagles. A wildlife biologist should assist layout.

DESCRIPTION OF UNIT ATTRIBUTES/OBJECTIVES

Timber Attributes:

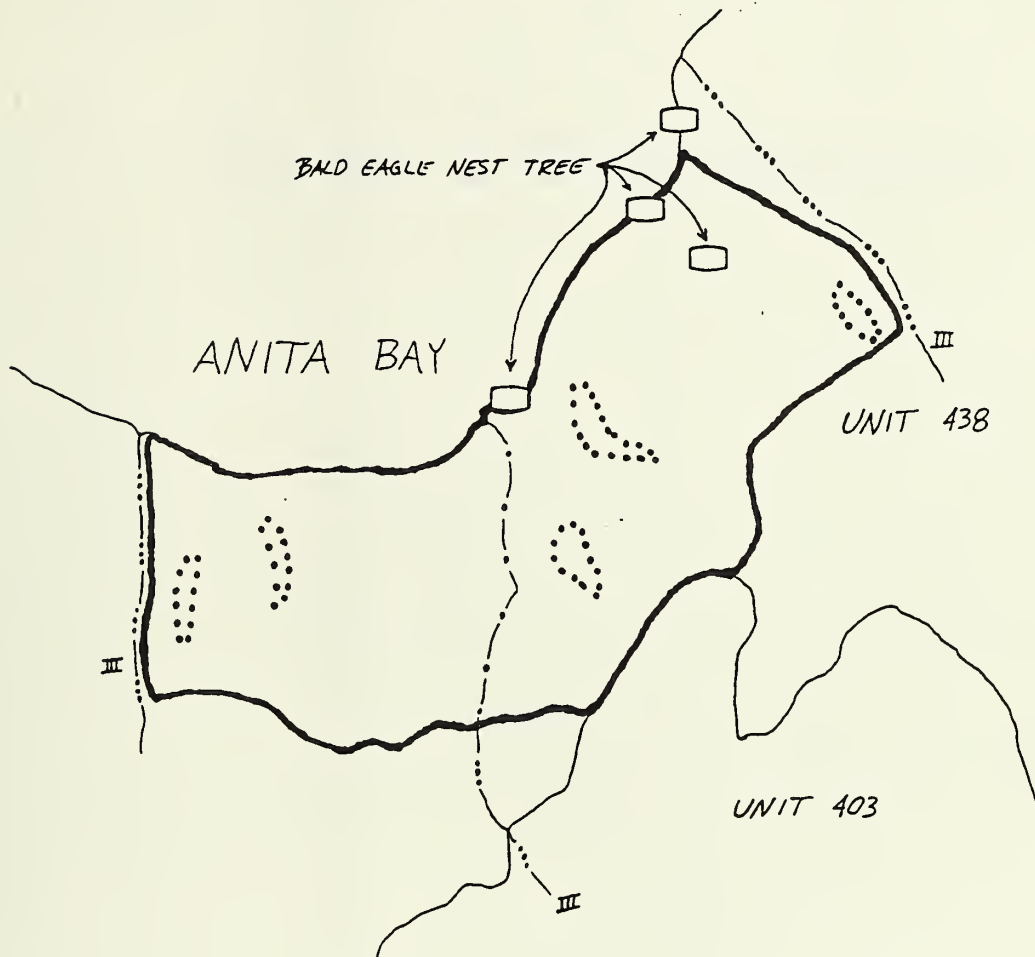
320 mbf Estimated total volume within the unit
25 mbf Estimated volume per acre for entire unit
Acres by Volume Class within the unit:
 Volume Class 4 (8-20 mbf/acre)
 13 Volume Class 5 (20-30 mbf/acre)
 Volume Class 6 (30-50 mbf/acre)
 Volume Class 7 (50+ mbf/acre)

Stand Management Objectives: LUD IV Rotation Period: +100 years
Regeneration Method: Natural Anticipated Treatments: Precommercial Thinning
Other Considerations: Evaluate mistletoe potential.

UNIT NO. 438

The settings depicted here are meant only to represent the concept of layout. The actual location of settings will be determined in the field with the help of a Landscape Architect and a Wildlife Biologist.

All settings are Heg



Approximate Drawing Scale: 1" = 660 feet (top of page is north)

Legend:

Planned Unit Boundary
 Setting Boundary
 Setting Number
 Existing Road
 Planned Spec. Road
 Planned Temp. Road
 Road Number
 Permanent Bridge
 Temporary Bridge
 Landing
 Existing Clearcut
 Internal Exclusions

Helicopter Yarding (clearcut)
 Helicopter Yarding (group selection)
 Cable Yarding
 Full Suspension
 Partial Suspension
 Watercourse
 AHMU Stream Classification
 AHMU Stream Classification boundary
 Watercourse-Primary Protection
 Watercourse-Secondary Protection
 Watercourse with 100-foot Buffer

Appendix C

Road Descriptions

APPENDIX C

ROAD DESCRIPTIONS

The following is a capsulation of the interdisciplinary team (IDT) analysis of a sample proposed road segment in the preferred alternative, Alternative 4. These descriptions are not "road cards," but the results of the IDT analysis of those cards at this point. The road cards are part of the planning file and can be seen in that file. They will continue to be used through the layout and harvest of units and the survey and construction of roads described in the Forest Service Manual.

It has to be anticipated that there will be some minor changes to the roads as depicted on these descriptions. It is virtually impossible, without final design of every section of road, to not have some changes. Exact conformance to preset lines, regardless of values, would not be proper management. Opportunities to not only protect newly discovered situations but also to optimize management intent without changing the environmental impacts have to be anticipated and instituted. The resources, as they are now known and analyzed, have been protected or enhanced to the greatest extent practicable.

If changes and the associated impacts develop which are outside the scope of the impacts envisioned with this Draft EIS, additional documentation may be required.

Road description narratives refer to numbered points on the three road description photos. The road description map is intended to be a summary of the key areas requiring coordination between engineering and other resources prior to construction. The following items are noted on the map:

New Rock Quarries: Rock quarry locations are tentative but represent the IDT's best estimate of their placement. Regardless of location, each rock pit will require a site plan prior to development. Resource values will be analyzed and mitigative measures will be required where appropriate in each pit development plan.

Visual Sensitivity Areas: Shows areas of road where landscape and visual concerns are high. If relocation of any rock quarries is necessary, the landscape architect will be consulted prior to changes.

Cultural Monitoring Areas: Shows areas of road within high/medium probability zone for cultural resources. Archaeologist will monitor roadside areas during construction.

Timing Restrictions: Construction windows are specified for these stream crossings.

ROAD DESCRIPTION

PROJECT NAME: Etolin Implementation MGT AREA: S23 VCU: 467
ROAD NUMBER: 51381 FUNCTIONAL CLASS: Local ENTRY CYCLE: Intermittent
LENGTH: 0.3 mi. TRAFFIC SERVICE LEVEL: D DESIGN SPEED: 10 mph
DESIGN VEHICLE: Logtruck CRITICAL VEHICLE: Yarder HIGHWAY SAFETY ACT: No
MAINTENANCE LEVELS: (ACTIVE SALE) 3 POST SALE: 1

INTENDED PURPOSE: To provide access for timber management activities and Forest Service administration.

TRAFFIC MANAGEMENT STRATEGY: Road will not be blocked after close of sale.

EROSION CONTROL: No special measures are required.

ROAD LOCATION: Main objective was to locate the road within yarding distance of the the backline of old Granite Unit 22, and to be in position to hit the bench just past the south boundary of Unit 421 for future landing location.

ROCK PITS: Rock for construction is planned to come from the existing marble pit near the junction of Rd. 51009.

FUTURE NEEDS: The road can continue to the south for future timber harvest.

TIMING RESTRICTIONS: None.

MONITORING NEEDS: None.

STREAM CROSSINGS: None.

ROAD DESCRIPTION

PROJECT NAME: Etolin Implementation MGT AREA: S23 VCU: 464
ROAD NUMBER: 51401 FUNCTIONAL CLASS: Local ENTRY CYCLE: Intermittent
LENGTH: 0.7 mi. TRAFFIC SERVICE LEVEL: D DESIGN SPEED: 10 mph
DESIGN VEHICLE: Logtruck CRITICAL VEHICLE: Yarder HIGHWAY SAFETY ACT: No
MAINTENANCE LEVELS: (ACTIVE SALE) 3 POST SALE: 1

INTENDED PURPOSE: To provide access for timber management activities and Forest Service administration.

TRAFFIC MANAGEMENT STRATEGY: Road will not be blocked after close of sale.

EROSION CONTROL: No special measures necessary.

ROAD LOCATION: Road follows top of small ridge (watershed divide) until it curves back to Unit 405. No culverts are needed until the road curves into the unit boundary. Specified location ends at east boundary of Unit 405. The road along the bottom of the unit will be temporary.

ROCK PITS: Rock for construction is planned to come from the existing pit at the junction of Rd. 6548, if visual concerns can be mitigated as expected during design. If not, rock will come from the existing pit behind the sortyard.

FUTURE NEEDS: Road may be extended to the south in the future for timber management. Water access to the road system from Burnett Inlet could be provided in the future by extending this road to the shore.

TIMING RESTRICTIONS: None

MONITORING NEEDS: None

STREAM CROSSINGS: None

ROAD DESCRIPTION

PROJECT NAME: Etolin Implementation MGT AREA: S23 VCU: 464
ROAD NUMBER: 51402 FUNCTIONAL CLASS: Local ENTRY CYCLE: Intermittent
LENGTH: 0.5 mi. TRAFFIC SERVICE LEVEL: D DESIGN SPEED: 10 mph
DESIGN VEHICLE: Logtruck CRITICAL VEHICLE: Yarder HIGHWAY SAFETY ACT: No
MAINTENANCE LEVELS: (ACTIVE SALE) 3 POST SALE: 1

INTENDED PURPOSE: To provide access for timber management activities and Forest Service administration.

TRAFFIC MANAGEMENT STRATEGY: Road will not be blocked after close of sale.

EROSION CONTROL: No special measures necessary.

ROAD LOCATION: Road follows gentle muskeg terrain along a watershed divide. Specified road location ends just before the stream crossing at the south end of Unit 406. A short temporary road crosses this stream and ends at a landing ~200ft. past the crossing.

ROCK PITS: Rock for construction is planned to come from the existing pit behind the sortyard

FUTURE NEEDS: Road will not be extended, but it is planned to be used in the future for landing helicopter volume coming from the upper Duckbill valley.

TIMING RESTRICTIONS: None

MONITORING NEEDS: None

STREAM CROSSINGS: See road description photo for corresponding numbered points on Rd. 51402. Forest development road ends before the crossing.

Point 1) ESTIMATE 48" CMP. Class III stream. Pipe to be removed after sale to avoid future maintenance problems.

ROAD DESCRIPTION

PROJECT NAME: Etolin Implementation MGT AREA: S23 VCU: 467
ROAD NUMBER: 51421 FUNCTIONAL CLASS: Local ENTRY CYCLE: Intermittent
LENGTH: 0.5 mi. TRAFFIC SERVICE LEVEL: D DESIGN SPEED: 10 mph
DESIGN VEHICLE: Logtruck CRITICAL VEHICLE: Yarder HIGHWAY SAFETY ACT: No
MAINTENANCE LEVELS: (ACTIVE SALE) 3 POST SALE: 1

INTENDED PURPOSE: To provide access for timber management activities and Forest Service administration.

TRAFFIC MANAGEMENT STRATEGY: Road will not be blocked after close of sale.

EROSION CONTROL: Be generous with relief culverts when crossing seeps. Minimize channel excavation downstream of crossing at pt. 2 and favor riprap. Possibility for some channel improvement work here.

ROAD LOCATION: The road begins at a 'T' intersection with Rd. 6542. Rd. 6542 may continue on through the lowlands near the head of Mosman Inlet in the future. Starting at this point avoids having two culverts right near the junction. The route then climbs at 15% to reach a bench just past pt. 2 and the saddle just past pt. 3.

ROCK PITS: Rock for construction is planned to come from the existing ribbon chert quarry on Rd. 6544.

FUTURE NEEDS: The road can continue past the saddle down the timbered slope for about 2 miles to the head of Mosman Inlet on the west side of Mirkwood Ck. Because of this possible extension the crossing at pt. 3 is a permanent culvert. For this sale a temporary spur road heads to the east just past pt. 3 for access to Unit 423.

TIMING RESTRICTIONS: None.

MONITORING NEEDS: None.

STREAM CROSSINGS: See road description photo for corresponding numbered points on Rd. 51421.

Point 1) ESTIMATE 48"-60" ARCH PIPE. Class III intermittent stream. Cobble substrate.

Point 2) ESTIMATE 72"-84" ARCH PIPE. Class III intermittent stream. Massive bedload movement. Crossing just below contained area and above an alluvial deposition area. Rock piled up against tree trunks in this area. Large CMPA needed to pass bedload. Crossing is in an 'S'-curve, channel will be straightened. Heavy armoring with riprap needed downstream. Possibility for some instream structure to help direct flow. Channel 10ft. wide x 3ft deep, dry most of the time.

Point 3) ESTIMATE 60" CMP. Class III intermittent stream. Bedrock controlled and stable.

ROAD DESCRIPTION

PROJECT NAME: Etolin Implementation MGT AREA: S23 VCU: 465,467
ROAD NUMBER: 51441 FUNCTIONAL CLASS: Local ENTRY CYCLE: Intermittent
LENGTH: 0.7 mi. TRAFFIC SERVICE LEVEL: D DESIGN SPEED: 10 mph
DESIGN VEHICLE: Logtruck CRITICAL VEHICLE: Yarder HIGHWAY SAFETY ACT: No
MAINTENANCE LEVELS: (ACTIVE SALE) 3 POST SALE: 1

INTENDED PURPOSE: To provide access for timber management activities and Forest Service administration.

TRAFFIC MANAGEMENT STRATEGY: Road will not be blocked after close of sale.

EROSION CONTROL: No special measures necessary.

ROAD LOCATION: Total length of forest development road 51441 constructed with this sale will be 0.7 miles. 0.4 miles of specified road will be constructed on the location of a temporary road built for the Granite Timber Sale (pts. 1 to 2). Work needed on this section is essentially just reinstalling culverts and removing waterbars. 0.3 miles will be completely new construction. At point 3 the route crosses a swale and then traverses steep terrain requiring full bench construction for ~600ft to a bench which begins at pt. 4. Excess excavation material will be end hauled to an area just west of pt. 3 and could be used for landing construction. Grade between pts. 3 & 4 is 15% favorable. Last 400ft of the road from pt. 4 to the last landing in Unit 420 is again on a gentle bench location.

ROCK PITS: Rock for construction is planned to come from the existing ribbon chert quarry on Rd. 6544.

FUTURE NEEDS: All timber tributary to this road will be harvested with this sale. Road location and design is specified all the way to the end in order to control construction between pts. 3 & 4. Rd. 51441, with a total length of 1.2 miles, will be used for second growth management.

TIMING RESTRICTIONS: None.

MONITORING NEEDS: None.

STREAM CROSSINGS: None.

ROAD DESCRIPTION

PROJECT NAME: Etolin Implementation MGT AREA: S23 VCU: 464
ROAD NUMBER: 51540 FUNCTIONAL CLASS: Local ENTRY CYCLE: Intermittent
LENGTH: 7.5 mi. TRAFFIC SERVICE LEVEL: D DESIGN SPEED: 10 mph
DESIGN VEHICLE: Low-boy CRITICAL VEHICLE: Low-boy HIGHWAY SAFETY ACT: No
MAINTENANCE LEVELS: (ACTIVE SALE) 3 POST SALE: 2

INTENDED PURPOSE: To provide access for timber management activities and Forest Service administration.

TRAFFIC MANAGEMENT STRATEGY: Keep open for administrative use.

EROSION CONTROL: Between point 5 & 6 approx. 200' of full bench and end haul construction is required. Shoulder of road is 65' slope distance from the edge of Falls Creek at the closest point. Clearing limits should be no more than 10' from shoulder along this section. Grass seeding should occur as soon as construction is essentially completed, if during a seeding window. This should be mentioned to the contractor at the pre-work meeting.

ROAD LOCATION: One objective was to locate the road through the low volume stands west of Pump Creek in order to assure their eventual harvest. The minimum overall cost method of developing the Pump Creek to Fishtrap Valley area was to route the Fishtrap volume through these stands, rather than build the ~1 3/4 miles of road through muskeg for a more direct haul. Between pts. 12 & 13 a minimum of 100' of buffer from edge of clearing to the beaver pond and possible class I outlet channel has been established during location. The specified road location has been ended at point 16. The crossing site at pt. 16 requires a bridge because of the naturally high level of debris and bedload movement. Due to it's location near the end of the road (~3/4 mile) it has been decided that past this crossing the road should be temporary and the bridge should be a log stringer to be removed at the end of the sale. There is an ~18 acre stand between this crossing (pt. 16) and Unit 407, but it should not be harvested for longer than the life of a permanent bridge (~50 years) due to the concentration of harvest in this area.

ROCK PITS: The first 2.8 miles of embankment are planned to come from the existing pit at the junction of 6539. A new pit will be needed at point 2 on the back side of a knob in Unit 413. 2.3 miles will be built from this pit to reach the next quarry site at point 9, as well as the 1.0 mile of Rd. 51541. This site at pt. 9 will require a .2 mile spur to reach a rock source not seen from Anita Bay. Any changes in this area must be coordinated with the landscape architect. Rock from pt. 9 will build 1.7 miles to pt. 14 where the last pit will be located. This pit must produce enough rock for 2.4 miles of both specified and temporary road

FUTURE NEEDS: Will be used for future timber management. A trail to alpine areas may be constructed in the future from somewhere near the end of this road. No firm plans exist for this trail as of now.

TIMING RESTRICTIONS: Restrictions specified for culvert installation at point 1 on Hump Creek (near Unit 418), due to the chance that sedimentation from construction may be harmful to coho salmon egg incubation. The construction window is between June 15 and August 15, during which time eggs should not be in the gravel.

MONITORING NEEDS: None

OTHER CONSIDERATIONS: Design for low-boy on this long local road should be easy due to the good alignment. Assist vehicles may be needed on the 15% grade between pts. 3 & 5.

STREAM CROSSINGS: See road description photo for corresponding point numbers on Rd. 51540. Point 1, the Hump Creek crossing, is the only site on 51540 that requires fish passage and timing restrictions.

Point 1) SITE 14-65B1, HUMPH CREEK. LARGE PIPE ARCH, 87"x63" MINIMUM. Class I stream. Very low gradient channel. ~1ft of gravel over bedrock substrate. Timing restrictions on instream activities. Fish passage required. Will likely require blasting of bedrock to bed the pipe at a low enough elevation to allow the bottom of the pipe to be covered with gravel.

Point 4) SITE 15-94B. LARGE PIPE ARCH (SPPA) OR 50' MINIMUM BRIDGE. Inventoried Class II stream, no fish observed. 60' waterfall 200' upstream. Gravel to boulder substrate. Bedrock exposed at near approach. Set pipe on steep grade 5%+ to keep pipe clear of rock and debris. Pipe may have to be shotgunned. Class IX or X riprap needed. There is some woody debris above crossing that should be removed if it isn't holding stream material. May have to anchor riprap to bedrock to prevent it from washing away. Minimum high flow is 15' x 3' deep. Slope is about 5%.

Point 5) SITE 15-94C - ESTIMATE 60"+CMP - NEED LARGE PIPE IN OVER FLOW CHANNEL 24 - 48". Class III intermittent stream. Gravel to boulder substrate. Flashy creek, lots of debris and bedload moving thru the system. Main channel is 6ft x 1 1/2ft deep overflow channel is 7ft x 1ft deep. Need riprap at inlet and outfall apron. Slope is 12-22% upstream and 25-30% downstream.

Point 6) SITE 15-94D - ESTIMATE 72"- 78"+ CMP OR CMPA. Class III intermittent stream. Gravel to boulder substrate. Alluvial plain, small overflow channels. Debris jams and steep grades upstream. Slope is 28% upstream and 10% downstream. Channel is more defined downstream. Straighten channel above pipe, riprap inlet and outlet. Stream at high flow 12ft x 2ft deep.

Point 7) SITE 15-94E - ESTIMATE 78"- 84"+ CMPA. Class III intermittent stream, ~50' falls 200' upstream. Gravel, cobble, bedrock substrate. Flashy, fast water 5-7 fps normal flow. Comes through a bedrock gorge 3ft x 12ft, the stream at crossing is 20ft x 2ft deep. Remove log upstream of crossing. Gorge is angled, follows a rock berm to crossing, at high flows could be as much as 25ft x 2 1/2ft deep.

Point 8) SITE 15-96A - ESTIMATE 78" EQUIVALENT ARCH PIPE. Crossing at the inventoried Class II to III transition, no fish observed. Gravel, cobble, boulder substrate. Banks made of same material. Many small falls from L.O.D. Need riprap upstream and an apron downstream. Stream is 10ft wide X 3ft deep at high flows. Slope is 4 - 9%. Upper site old P-section 760 would require 35 - 40ft bridge over bedrock falls and chutes - 40% slope.

Point 10) SITE 15-96A1 - ESTIMATE 60" CMP. Intermittent Class III stream.

Point 11) SITE 15-96A2 - ESTIMATE 48" CMP. Intermittent Class III stream.

Point 12) SITE 15-96B1 - ESTIMATE 48" CMP. Intermittent Class III stream.

Point 15) SITE 15-98A - ESTIMATE 60"+ CMP. Intermittent Class III stream. Gravel, cobble, boulder substrate. Bedrock exposed above site. Steep upper section 60%. Lower section is an alluvial plain. Slope through this section varies between 15 -25%. The crossing should be down off the steep area. Use the north channel to funnel flow. Channel at high flow 7ft wide x 3ft deep.

Point 16) SITE 15-98B - ESTIMATE 35ft TEMPORARY LOG STRINGER BRIDGE. Class III stream. Cobble, boulder, bedrock substrate. Heavy bedload and debris passing through the site. It would be difficult to keep a pipe in due to the debris. 6 ft. of exposed bank - stream not degrading, banks are washing due to high flows and debris. Average high flow 3ft. Need class IX or X riprap. Slope upstr. 23% - slope dwnstr. 18%. Stream width is about 25-30ft wide at high flows.

ROAD DESCRIPTION

PROJECT NAME: Etolin Implementation MGT AREA: S23 VCU: 464,467
ROAD NUMBER: 51541 FUNCTIONAL CLASS: Local ENTRY CYCLE: Intermittent
LENGTH: 0.9 mi. TRAFFIC SERVICE LEVEL: D DESIGN SPEED: 10 mph
DESIGN VEHICLE: Logtruck CRITICAL VEHICLE: Yarder HIGHWAY SAFETY ACT: No
MAINTENANCE LEVELS: (ACTIVE SALE) 3 POST SALE: 1

INTENDED PURPOSE: To provide access for timber management activities and Forest Service administration.

TRAFFIC MANAGEMENT STRATEGY: Road will not be blocked after close of sale.

EROSION CONTROL: No special measures necessary.

ROAD LOCATION: Road pitches steeply (18% favorable) for ~1400ft between pts. 1 & 2 in order to gain elevation and reach a good bench location between pts. 2 & 3. Road then traverses steeper ground (~50% sideslopes) for ~600ft to reach the bench on which the last three landings of Unit 412 are located.

ROCK PITS: Rock for construction is planned to come from a new quarry at pt. 2 on Rd. 51540.

FUTURE NEEDS: Road cannot be extended, but it is planned to be used in the future for landing helicopter volume coming from the upper Pump Creek valley.

TIMING RESTRICTIONS: None.

MONITORING NEEDS: None.

STREAM CROSSINGS: None.

ROAD DESCRIPTION

PROJECT NAME: Etolin Implementation MGT AREA: S23 VCU: 464

ROAD NUMBER: 51543 FUNCTIONAL CLASS: Local ENTRY CYCLE: Intermittent

LENGTH: 0.6 mi. TRAFFIC SERVICE LEVEL: D DESIGN SPEED: 10 mph

DESIGN VEHICLE: Logtruck CRITICAL VEHICLE: Yarder HIGHWAY SAFETY ACT: No

MAINTENANCE LEVELS: (ACTIVE SALE) 3 POST SALE: 1

INTENDED PURPOSE: To provide access for timber management activities and Forest Service administration.

TRAFFIC MANAGEMENT STRATEGY: Road will not be blocked. Portable bridge will likely be pulled for use elsewhere on the island when needed.

EROSION CONTROL: Near approach to the bridge crossing at pt. 1 will need to be built up to achieve grade. This fill will need large riprap for protection against erosion.

ROAD LOCATION: Only control point is the crossing of Fishtrap Creek. Location of the specified road ends at the last landing in Unit 409. Road past this point is temporary and crosses the toe of the snow/rock slide zone between units 408 & 409 just above a braided channel area. A short log stringer bridge is planned here to be pulled at the end of the sale to prevent any long term problems with the crossing.

ROCK PITS: Quarry at point 14 on Road 51540 will be used for construction of Rd. 51541.

FUTURE NEEDS: All of the commercial forest land available from this road will be harvested in this sale. Road is a forest development road to control construction of the crossing and facilitate second growth management.

TIMING RESTRICTIONS: Limit crossing of Fishtrap Creek with equipment to the period between July 15 to August 15, due to the chance that sedimentation from construction activities may harm fish eggs (steelhead, coho, cutthroat) which will be in the gravel somewhere on Fishtrap Creek at all other times.

MONITORING NEEDS: None

STREAM CROSSINGS: See the road description photo for corresponding point numbers on Rd. 51543.

Point 1) SITE 15-98A1, FISHTRAP CREEK - MAJOR BRIDGE SITE - 65FT+. Inventoried Class II stream. Cobble, boulder, bedrock substrate. Bedrock observed upstream. Low area at near approach will need to be built up with fill or wire wall depending on grade. Ice scars observed 6ft+ above stream bottom. Bedrock knobs force meandering in stream. Spread sills O.K. for far approach. Bridge should be at least 10ft above stream. Stream is 45ft x 3-5ft deep at high flow. Average flow 5-7fps. Note bridge length may increase due to minimum bottom of superstructure elevation being high (10ft). Will need class IX riprap for protection.

ROAD DESCRIPTION

PROJECT NAME: Etolin Implementation MGT AREA: S23 VCU: 467
ROAD NUMBER: 51581 FUNCTIONAL CLASS: Local ENTRY CYCLE: Intermittent
LENGTH: 1.4 mi. TRAFFIC SERVICE LEVEL: D DESIGN SPEED: 10 mph
DESIGN VEHICLE: Logtruck CRITICAL VEHICLE: Yarder HIGHWAY SAFETY ACT: No
MAINTENANCE LEVELS: (ACTIVE SALE) 3 POST SALE: 1

INTENDED PURPOSE: To provide access for timber management activities and Forest Service administration.

TRAFFIC MANAGEMENT STRATEGY: Road will not be blocked at the end of the sale.

EROSION CONTROL: Oversize the culvert at point 1 to pass debris and bedload, and armor the outlet.

ROAD LOCATION: Main objective was to avoid road construction on the south side of Wetbeck creek through the incised glacial till. Location on the north side of the creek traverses gentle terrain and also avoids another crossing of Wetbeck. Past point 2 the timber on the south side of Wetbeck is planned to be skyline yarded across the creek to landings on Rd. 51581. Specified road location continues to the crossing at pt. 3 so the portable bridge at pt. 2 will remain in place after this sale.

ROCK PITS: The existing rock pit near the junction of 6558 will be used to provide embankment material for Rd. 51581. This pit cannot be seen from Mosman Inlet.

FUTURE NEEDS: Will be used for future timber management activities.

TIMING RESTRICTIONS: None

MONITORING NEEDS: None

STREAM CROSSINGS: See the road description photo for corresponding numbered points.

Point 1) ESTIMATE 72" CMP. Intermittent Class III stream. Oversize the pipe to pass debris and bedload and armor the outlet.

Point 2) ESTIMATE 35-40FT PORTABLE BRIDGE. Class III stream. Bedrock, boulder, cobble substrate. Fast moving creek, debris above. Bedrock banks both sides. Overall stream gradient ~20%. ~10% at crossing.

Point 3) ESTIMATE 30-40FT NATIVE LOG STRINGER BRIDGE. Bridge to be removed at end of sale. Class III stream. Bedrock substrate. Bedrock falls with alluvial fan below. Stream at high flows is 15ft x 2ft deep.

ROAD DESCRIPTION

PROJECT NAME: Etolin Implementation MGT AREA: S23 VCU: 464
ROAD NUMBER: 51723 FUNCTIONAL CLASS: Local ENTRY CYCLE: Intermittent
LENGTH: 0.6 mi. TRAFFIC SERVICE LEVEL: D DESIGN SPEED: 10 mph
DESIGN VEHICLE: Logtruck CRITICAL VEHICLE: Yarder HIGHWAY SAFETY ACT: No
MAINTENANCE LEVELS: (ACTIVE SALE) 3 POST SALE: 1

INTENDED PURPOSE: To provide access for timber management activities and Forest Service administration.

TRAFFIC MANAGEMENT STRATEGY: Road will not be blocked after close of sale.

EROSION CONTROL: Riprap culvert outfall at point 1.

ROAD LOCATION: Road stays above a rock bluff control point as it enters Unit 401 from the west. Next objective was to hit the bench in the middle of the unit for landings and future road extension to the southeast. This road will look like an extension of Rd. 6272 until the time, if ever, that road is completed.

ROCK PITS: Rock for construction is planned to come from the new pit at point 2 on road 6272.

FUTURE NEEDS: Road will be extended in the future for timber management.

TIMING RESTRICTIONS: None

MONITORING NEEDS: None

STREAM CROSSINGS: No fish streams or tributaries to fish streams are crossed. See road description photo for corresponding numbered points on Rd. 51723.

Point 1) ESTIMATE 36" CMP. Old slump depositional feature just downslope of road crossing. Place riprap for energy dissipation before flow reaches slump.

ROAD DESCRIPTION

PROJECT NAME: Etolin Implementation MGT AREA: S23 VCU: 464
ROAD NUMBER: 6272 FUNCTIONAL CLASS: Collector ENTRY CYCLE: Constant
LENGTH: 4.9 mi. TRAFFIC SERVICE LEVEL: D DESIGN SPEED: 20 mph
DESIGN VEHICLE: Low-boy CRITICAL VEHICLE: Low-boy HIGHWAY SAFETY ACT: No
MAINTENANCE LEVELS: (ACTIVE SALE) 3 POST SALE: 2

INTENDED PURPOSE: To provide access for timber management activities and Forest Service administration.

TRAFFIC MANAGEMENT STRATEGY: Keep open for administrative use.

EROSION CONTROL: Sideslopes ranging from 55-70% between points 6 & 7, and 9 & 10 necessitate full bench construction for ~1200' in this area (near Unit 402). Excess excavation will be end hauled to a bench just west of point 6.

ROAD LOCATION: Main objectives were to hit the control point at the top of the major V-notch for a crossing at point 4, and to place the road to take advantage of the major slope break running for ~1 mile past point 2 for landings and visual screening. Approx. 1900' of constant 15% favorable grade is needed to reach point 2.

ROCK PITS: Coordination between landscape architect and geotech resulted in the selection of a quarry site at point 2 which faces inland away from both Anita Bay and Burnett Inlet. The rock is a brownish metasediment. Rock for construction to point 2 will come from an existing pit at the junction of 6548 and 6540 if visual concerns can be mitigated in the pit development plan. If not, rock will be hauled from an existing pit behind the sortyard.

FUTURE NEEDS: This road may connect to the Olive Cove road system providing an intertie between the Olive Cove area and the interior of Etolin Island.

TIMING RESTRICTIONS: None

MONITORING NEEDS: None

OTHER CONSIDERATIONS: The rock that will be exposed in cutbanks from ~1/2 mile past point 2 until the gentle terrain past point 10 is a white granitic. If sections of exposed rock are highly visible, spraying of rock weathering agents will be considered for addition to the Sale Area Improvement Plan.

STREAM CROSSINGS: No fish streams or tributaries to fish streams are crossed. See road description photo for corresponding numbered points on Rd. 6272.

Point 1) SITE 17-185A. ESTIMATE 60" CMP. Class III stream. 20' deep v-notch, stream grade ~10% at crossing. Oversize pipe due to height of fill.

Point 3) SITE 18-23B. ESTIMATE 72"+ CMP. Intermittent Class III stream. Bedrock, boulder, cobble substrate. Channel cuts through colluvial debris flow on a 45% grade. Large rock moving down the system. Banks 3-5' high, 7' across channel. Shotgun pipe onto large riprap outfall. Riprap inlet also. Use arch for debris/rock passage. Section of road just before and after site need 24" cmp's in the old channels.

Point 4) SITE 18-23D. ESTIMATE MINIMUM 72' BRIDGE. Intermittent Class III stream. Bedrock bottom chute, 30-35% stream gradient. Toe of avalanche chute, head of major v-notch. Minimum bottom of superstructure is at 10' above stream bottom. May need longer bridge depending on horizontal and vertical curve alignment. Crossing will be skewed. May need wire walls. No riprap - keep bridge out of chute area.

Point 5) SITE 18-23D1. ESTIMATE 60" CMP. Intermittent Class III stream. Good flow in spring and early summer. Bedrock substrate. 25' falls above pipe crossing. May have to blast to get pipe in place. 18% gradient at crossing, 30% below.

Point 8) SITE 18-23H. ESTIMATE 60" CMP. Intermittent Class III stream. Cobble, gravel substrate, bedrock appears in banks at stream edge. Place crossing below confluence of two streams. Additional stream above pipe crossing adds alot of extra water to the system. Stream drops rapidly downstream. Slope 12% upstream, 25% downstream. Riprap inlet and outlet. Shotgun pipe.

Point 11) SITE 19-84A. ESTIMATE 112" x 75" CMPA. Class III stream. Cobble, bedrock substrate, alluvial fan area. Channel is ~11ft wide by 3ft deep. Crossing goes through straight section, old channel forks above crossing and is plugged with large material. Overflow channel (old channel) flows during storm events. Large amount of debris and bedload is flushed through the system. Alluvial fan ends ~300ft upstream. This would be a better crossing but would require massive amounts of excavation to locate road in and out. Overall impacts less with lower crossing.

Point 12) SITE 19-84B. ESTIMATE 60"+ CMP. Class III stream. Bedrock substrate, double water falls above crossing. Channel 6ft wide x 1 1/2ft deep. Slope 7-10% at crossing. Will need to blast to place pipe. May need outlet riprap if pipe is shotgunned.

Point 13) SITE 19-84C. ESTIMATE 60"-72" CMP. Class III stream. Cobble, boulder substrate, shallow bedrock exposed. Channel 7ft wide by 1 to 1 1/2ft banks. Slope 20% at crossing, 8% above, 15% below.

STARFISH TIMBER SALE FEIS

4
n

NEW SPECIFIED ROAD —————

NEW TEMPORARY ROAD - - - - -

UNIT BOUNDARY * * *

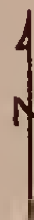
EXISTING CLEARCUT CC

GROUP SELECTION

AREA BOUNDARY * * *

SCALE: 1" = 2640'

ROAD
DESCRIPTION
PHOTO



LEGEND

- NEW SPECIFIED ROAD —
- NEW TEMPORARY ROAD - - -
- UNIT BOUNDARY — x —
- EXISTING CLEARCUT CC

SCALE: 1" = 2640'



5130

63

63



ROAD
DESCRIPTION
PHOTO



LEGEND

NEW SPECIFIED ROAD ———
NEW TEMPORARY ROAD - - - -
UNIT BOUNDARY — x — x —
EXISTING CLEARCUT CC

SCALE: 1" = 2640'

ROAD DESCRIPTION MAP

PETERSBURG (A-2) QUADRANGLE
ALASKA

1:50,000 SERIES (TOPOGRAPHIC)



LEGEND

EXISTING ROAD

NEW SPECIFIED ROAD

NEW ROCK QUARRY

ROAD SEGMENTS REQUIRING:
VISUAL SENSITIVITY

CULTURAL MONITORING

STREAM CROSSINGS REQUIRING:
TIMING RESTRICTIONS

Appendix D

Stream Channel Process Groups

APPENDIX D

STREAM CHANNEL PROCESS GROUPS

The term "process group" refers to a group of stream channels that were all formed by the same geologic processes. This appendix describes nine different process groups, lists the stream channel types in each group, and explains some of the management implications of each group.

Floodplain Stream Channels

These are channels (designated as B1, C1, C3, C4, and C6 channel types in the process group delineation in Draft F of the Tongass Land Management Plan revision) with active floodplain development. Floodplain channels have a two-way interaction between the stream channel and the floodplain area through bank erosion, channel migration and overflow, leaf fall, and blowdown/tree fall. Alluvial channels process energy for the stream and are an important source of nutrients. Flooding is a fundamental process in alluvial channels. The riparian zone is usually very broad and adjacent upland plants do not directly influence the riparian areas.

The riparian areas are extremely dynamic because streamflows within alluvial or uncontained areas are generally poorly contained and flood during seasonal or individual storms. Stream channel banks consists of unconsolidated materials, either alluvial sands, gravels or organic material. Channel migration and braiding of the stream channels occurs with varying frequency, depending on bank and bed stability. The bed and bank stability are usually tied to the adjacent plants. Trees and shrubs are very important to controlling the stability of the streambanks, as their root network often is the only thing holding together the unconsolidated alluvial streambank soil. Large Organic Debris (LOD) plays an important role in controlling the stability of the stream bed and banks by regulating the stream's energy dissipation. Habitat forms in the pool riffles caused by the energy dissipation. The riparian area adjacent to the alluvial channels encompasses the channel banks, active channel floodplain, sloughs, backwater overflow channels, and ponded swales. Because of the interactions of the stream with the adjacent landform, the alluvial channels contain a richer, more abundant community of fish than found in contained stream channels.

Channels on the Alluvial Fans

These channels (designated as A3 and B5 in the process group delineation in Draft F of the Tongass Land Management Plan revision) are transitional, being streams that are dominated by both sediment transport and sediment deposition. High energy streamflows of low to moderate magnitude are delivered to fans from their upstream contained drainage basins. Flood flows which occur episodically are a result of flash floods or debris torrents delivering high volumes of sediment which are quickly deposited on the streambed, streambanks, and areas adjacent to the stream. Stream channel migration or abandonment often occurs during these events. The stream channels are numerous and are generally found throughout the fan area. Many of the channels are ephemeral.

The rearing and spawning habitat value of fan channel types for salmon and trout varies from high or low. The channels are unstable, and sometimes intermittent during low streamflow periods in the summer and winter months, thereby limiting their use for rearing coho salmon and resident trout. The gravel beds are unstable due to the high energy flows and the large amounts of coarse gravels moving through the fan channels, so successful spawning is limited. However, on the toe end, or lower gradient portions of the fans, the value is higher for spawning and rearing for coho and pink salmon. Where abundant LOD is present, the value for coho salmon can be moderate to high. The toe ends are also characterized by more stable gravel beds, thereby increasing spawning value.

Channels with "Mixed" or Colluvial Control

As the name implies, these channels (designated as B2 and B3 channels in the process group delineation in Draft F of the Tongass Land Management Plan revision) are a mixture of stream channel containment. Some segments are controlled by bedrock or the valley walls, while other areas have minor floodplains. Within these moderate gradient channel types, the bedrock segments of the channel act as sediment transport systems, while bed materials are deposited in the lower gradient and floodplain development is apparent.

The habitat capability and sensitivity of these channels to disturbances caused by management is midway between floodplain and contained channels. The importance of the interaction between the stream channel and riparian vegetation is intermediate. Much of the better rearing habitat, particularly the coho salmon winter refuge habitat, is associated with LOD accumulations in the stream. Within "mixed" channel types microhabitats that provide winter refuge may be even more important than in the alluvial streams.

Low Gradient Contained Channels

These are streams (designated as C2, C5 channel types in the process group delineation in Draft F of the Tongass Land Management Plan revision) where the channel is contained by the adjacent landform with the channel having little effect on that landform. The adjacent influence zone often extends to the slope break above the incised valley slope. The width of the zone of influence on the aquatic habitat is dependent upon the adjacent upland soils and vegetation (primarily trees). The adjacent vegetation plays a major role in controlling the rate of downslope movement of soil into the stream channels, as well as providing energy dissipation structures in the stream channels to trap and store sediment that is being transported downstream.

The lower gradient channels contain habitat for large numbers of spawning pink salmon, particularly in the lower segments where large accumulations of suitable sized spawning substrates exist. Rearing habitat, particularly winter refuge habitat, is limited to sections of the stream where large quantities of LOD have accumulated in the stream.

**Moderate Gradient
Contained Channels**

These channels (designated as B4 and B6 channel types in the process group delineation in Draft F of the Tongass Land Management Plan revision) are also contained by the adjacent landform, with moderate instream gradients. Stream energy, substrates, and run-off are effectively contained by landform or streambank features. When the adjacent sideslopes are short, low gradient, or absent the influence zone is narrow. This group can have streams with very large, high gradient sideslopes which correspond to large areas that influence stream conditions. These streams are very much influenced by the highly sensitive natures of these sideslopes.

The moderate gradient channels contain limited amounts of anadromous fish habitat. When access is available, spawning habitat is limited due to lack of suitable sized substrates. Rearing habitat is limited to summer habitat for coho and steelhead trout. Moderate gradient contained channels usually provide moderate resident fish rearing potential.

**High Gradient
Contained Channels**

These channels (designated as A1, A2, A4, A5, A6, A7 and B7 channel types in the process group delineation in Draft F of the Tongass Land Management Plan revision) are source streams for downstream waters and transport organic and inorganic sediments to the downstream habitats. The stream channels are well contained within the narrow valley bottoms. Channel banks are steep and generally composed of large material, either consolidated bedrock or well packed boulders, rubble, and cobbles. The riparian vegetation along currant brush communities. The channels are predominately influenced by the upland or terrestrial plant communities. Soils in the adjacent upland area are often shallow and subject to downslope movement. Leaves, forest litter, and trees often move downslope into these incised channels when disturbance occurs.

High gradient contained streams generally do not produce anadromous fish, as numerous waterfalls and cascades prevent access. The lack of high quality rearing pools limits the production of resident fish.

Glide Streams

These channels (designated as L1 and L2 in the process group delineation in Draft F of the Tongass Land Management Plan revision) occur throughout the watershed on gently sloping lowlands landforms and are frequently associated with bogs and marshes, or lakes. Because of the low gradient, most of the sediment being transported in the stream channels is sand sized or smaller, and much of it settles out in the gently gradient channels. Though the channels are shallowly incised, and have fair flow containment, flood flows usually overtop the streambanks and flow onto the adjacent landform, lessening downstream flooding and serving as a buffer during major storms. Low gradient, slow flowing streams are often associated with temperature sensitive watersheds. The lower banks are composed of material that erodes easily. Productivity of the channel is moderately tied to the riparian/terrestrial interaction. The bank trees control the channel stability in the floodplain control areas.

Glide streams have moderate to high capability for coho salmon. Spawning gravels are not abundant, but are usually sufficient to fully seed the available habitat. The channels provide summer coho rearing habitat, but usually more limited "overwinter" habitat, due to the lack of abundant large complex pools that provide quality winter refuge. C7 channels that form the outlet channels of lakes do provide good overwinter habitat due to the temperature moderation of the upstream lake waters. The better rearing habitat, particularly winter refuge habitat is tied to undercut banks and LOD controls the long term maintenance of much of the rearing and spawning habitat. The channels are frequently used by pink salmon for spawning.

Estuarine Stream Channels

These channels (designated as E1, E2, E3 and E5 channels in the process group delineation in Draft F of the Tongass Land Management Plan revision) occur at the mouths of watersheds within estuarine landforms. The single to multiple channels are shallowly incised with fair to poor flow containment and are characterized by small alluvial material. The various channel types within the estuarine group are differentiated by channel substrate size. Sediments produced from the watershed are ultimately deposited in the estuarine channels. Consequently, they are highly sensitive to upstream management activities.

The streambanks and channel beds are composed of loose, fine textured material which are easily eroded. As a result, bank widths and depths are highly variable and bank and channel beds are stable. Sedge and marshland plants dominate the streamside and the interaction between the upland plants and the stream environment is minor. Stream migration and braiding varies, depending largely on bank and bed stability. The bed stability is critical for the production of pink salmon fry from the estuarine areas. Where the streams are excellent producers of pink salmon. These channels provide important rearing habitat for most species.

Lakes and Ponds

These types (designated as L, L3, L4 and L5 channels in the process group delineation in Draft F of the Tongass Land Management Plan revision) consist of lakes and ponds (including most beaver ponds). Lakes contain valuable aquatic habitat for some fish species, primarily sockeye and coho salmon, and trout.

Appendix E

Soil Hazard Classes

APPENDIX E

SOIL HAZARD CLASSES

Mass-wasting as used here is restricted to relatively shallow translational failures of the soil mass, and specifically excludes deep rotational failures and debris failures within stream channels. While slope gradient is the primary site factor determining the stability of natural slopes, soil and geologic properties, such as cohesion, moisture regime and the presence of a prominent slip-plane are used to determine relative stability of soil/landtype units. The relative ranking is based on state-of-the-art research, laboratory data on soil properties, as well as our collective experience in the management of similar soil/landtype areas on the Tongass N.F.

HIGH

The soil/landtype units in this class are the least stable, and have the greatest probability of slope failure. These units generally have slope gradients that exceed the natural angle of stability. It includes most well drained soils on slopes of 75 percent or greater, as well as some soils with restricted drainage (somewhat poorly and poorly drained soils) on slopes in excess of 65 percent. Most natural occurring landslides initiate in units of this class. They often, but not always, have visible indications of instability or past failures, such as slide scarps, tension cracks, jack-strawed trees, mixed pedogenic horizons etc.

The risk of management induced slope failures is so high on these areas that they are generally precluded from normal forest harvest and roading activities. Where management activities can not be avoided on these areas, site specific investigations are necessary to determine on a case-by-case basis; (1) the probability of failure based on a site-specific stability analysis; and (2) the likely effect of a failure on associated resources such as water quality, fish habitat, etc. Forest roads can sometimes be built on these areas by locating them on included areas of less sloping benches, or by the application of unusual, and often prohibitively expensive, mitigative measures such as retaining walls, buttresses, bulkheads or other external support systems.

MODERATE

The soil/landtype units in this class are generally stable in an undisturbed condition, however, any natural disturbance or management practice that adversely changes the complex soil strength-stress relationship can result in slope failures. These areas rarely have visible indications of instability.

Soil/landtypes in this class can be safely managed without a high risk of landslides by application of management practices designed to maintain the shear strength of soil and roots, and avoid increasing the effective weight of the soil mass. Management practices should be designed to avoid interrupting the natural surface and subsurface drainage patterns and minimize disturbance to the soil surface.

LOW

Soil/landtype units in this class have the least probability of landslides. Any slope failures that do occur are usually associated with included incised stream channels (V-notches), or short steep escarpments. This class includes most soils with slope gradients less than 35 percent.

These areas are normally not subject to mass wasting, however management practices designed to protect streambanks and v-notches, and prevent surface erosion are appropriate.

Appendix F

Appraisal Worksheets

APPRAISAL SUMMARY

Sale Name: STARFISH ALT. 1

Checked By: RCA

Date: JULY 24 1991

Spec. Rd. Const: 23.7 Miles Reconstruction 0.0 Miles Profit in Rds \$338,910.00
 \$6.16/MEF
 Product: App.to: Haul Temporary Road Const 2.3 Miles Purch.Crd.Lmt \$3,728,010.00
 1: Wrangell 7 Miles
 Ketchikan
 Base Year Data: AMEND. #87 ID #62 Temp.Road Cst \$246,100.00
 Adjusted To: 0 Quarter

1	Product/Unit	1-1	1-1	1-1	1-1				1
2	Volume Class	VC 4	VC 5	VC 6	VC 7				TOTAL/AVE.
3	Species Code								//////////
4	% by V.C.	11.6	40.3	48.1	0.0			T	100.0
5	Volume	6360	22186	26495	0	0	0	T	55,041
6	Sell Val(LT)							A	
7									
8									
9									
10	Selling Value LS	356.21	322.89	311.15	337.08	0.00	0.00	0.00 A	321.09
11	Felling & Bucking	41.85	31.84	27.01	20.57	0.00	0.00	0.00 A	30.67
12	Skid Load & Deprec.	153.31	119.94	110.53	62.40	0.00	0.00	0.00 A	119.26
13									
14	SUB. Stump to Truck	195.16	151.78	137.54	82.97	0.00	0.00	0.00	
15	Haul Dump Raft & Tow	27.42	27.54	27.62	27.78	0.00	0.00	0.00 A	27.56
16	Road Maintenance	2.68	2.68	2.68	0.01	0.00	0.00	0.00 A	2.68
17	SUB. Transportation	30.10	30.22	30.30	27.78	0.00	0.00	0.00	
18	Gen. Logging Ovrhd	5.31	5.31	5.31	0.01	0.00	0.00	0.00 A	5.31
19									
20	SUB Administration	5.31	5.31	5.31	0.01	0.00	0.00	0.00	
21	Slash Disposal	0.00	0.00	0.00	0.01	0.00	0.00	0.00 A	0.00
22	Erosion Control	0.52	0.52	0.52	0.52	0.00	0.00	0.00 A	0.52
23	Snag Disposal	0.00	0.00	0.00	0.00	0.00	0.00	0.00 A	0.00
24									
25	SUB Envrnmtl. Prtc	0.52	0.52	0.52	0.53	0.00	0.00	0.00	
26	Temporary Roads	4.47	4.47	4.47	0.01	0.00	0.00	0.00 A	4.47
27	Other Temporary Dev	1.82	1.82	1.82	0.01	0.00	0.00	0.00 A	1.82
28	SUB Temporary Dev	6.29	6.29	6.29	0.01	0.00	0.00	0.00	
29	SUB Logging Costs	237.38	194.11	179.95	0.01	0.00	0.00	0.00 A	192.30
30	Specified Road Cost	67.73	67.73	67.73	0.01	0.00	0.00	0.00 A	67.73
31	TOTAL LOG COSTS	305.11	261.84	247.68	0.01	0.00	0.00	0.00 A	260.03
32	Manufacturing LT							A	
33									
34	Manufacturing LS	0.00	0.00	0.00	0.00	0.00	0.00	0.00 A	0.00
35	TOT PRODUCTION COST	305.11	261.84	247.68	0.01	0.00	0.00	0.00 A	260.03
36	CONVERSION	51.10	61.05	63.47	0.01	0.00	0.00	0.00 A	61.06
37	P & R Ratio	13.20	13.31	13.76	13.95	0.00	0.00	0.00 N	13.51
38	P & R Margin*(60%)*	46.53	47.22	47.75	0.01	0.00	0.00	0.00 N	53.55
39	Indtd. Net Stumpage	4.57	13.83	15.72	0.00	0.00	0.00	0.00 A	13.67
40	Indtd. Ad Rates	72.30	81.56	83.45	0.01	0.00	0.00	0.00 A	81.40

APPRAISAL SUMMARY

Sale Name: STARFISH ALT. 2

Checked By: RCA

Date: JULY 24 1991

Spec. Rd. Const: 32.3 Miles Reconstruction 0.0 Miles Profit in Rds \$465,707.27
 \$7.67/MF
 Product: App.to: Haul Temporary Road Const 2.8 Miles Purch.Crd.Lmt \$5,122,780.00
 1: Wrangell 10 Miles
 Ketchikan
 Base Year Data: AMEND. #87 ID #62 Temp.Road Cst \$296,800.00
 Adjusted To: 0 Quarter

1	Product/Unit	1-1	1-1	1-1	1-1				1
2	Volume Class	VC 4	VC 5	VC 6	VC 7				TOTAL/AVE.
3	Species Code								//////////
4	% by V.C.	8.5	46.6	44.9	0.0			T	100.0
5	Volume	5141	28290	27248	0	0	0	T	60,679
6	Sell Val(LT)							A	
7									
8									
9									
10	Selling Value LS	356.21	322.89	311.15	337.08	0.00	0.00	0.00 A	320.44
11	Felling & Bucking	41.85	31.84	27.01	20.57	0.00	0.00	0.00 A	30.52
12	Skid Load & Deprec.	154.06	119.03	111.97	62.40	0.00	0.00	0.00 A	118.83
13									
14	SUB. Stump to Truck	195.91	150.87	138.98	82.97	0.00	0.00	0.00	
15	Haul Dump Raft & Tow	31.32	31.44	31.52	31.68	0.00	0.00	0.00 A	31.47
16	Road Maintenance	3.82	3.82	3.82	0.01	0.00	0.00	0.00 A	3.82
17	SUB. Transportation	35.14	35.26	35.34	31.69	0.00	0.00	0.00	
18	Gen. Logging Ovrhd	5.31	5.31	5.31	0.01	0.00	0.00	0.00 A	5.31
19									
20	SUB Administration	5.31	5.31	5.31	0.01	0.00	0.00	0.00	
21	Slash Disposal	0.00	0.00	0.00	0.01	0.00	0.00	0.00 A	0.00
22	Erosion Control	0.52	0.52	0.52	0.52	0.00	0.00	0.00 A	0.52
23	Snag Disposal	0.00	0.00	0.00	0.00	0.00	0.00	0.00 A	0.00
24									
25	SUB Envrnmntl. Prtc	0.52	0.52	0.52	0.53	0.00	0.00	0.00	
26	Temporary Roads	4.89	4.89	4.89	0.01	0.00	0.00	0.00 A	4.89
27	Other Temporary Dev	1.65	1.65	1.65	0.01	0.00	0.00	0.00 A	1.65
28	SUB Temporary Dev	6.54	6.54	6.54	0.01	0.00	0.00	0.00	
29	SUB Logging Costs	243.43	198.50	186.69	0.01	0.00	0.00	0.00 A	197.01
30	Specified Road Cost	84.42	84.42	84.42	0.01	0.00	0.00	0.00 A	84.42
31	TOTAL LOG COSTS	327.85	282.92	271.11	0.01	0.00	0.00	0.00 A	281.43
0	Manufacturing LT							A	
33									
34	Manufacturing LS	0.00	0.00	0.00	0.00	0.00	0.00	0.00 A	0.00
35	TOT PRODUCTION COST	327.85	282.92	271.11	0.01	0.00	0.00	0.00 A	281.43
36	CONVERSION	28.36	39.97	40.04	0.01	0.00	0.00	0.00 A	39.01
37	P & R Ratio	13.20	13.31	13.76	13.95	0.00	0.00	0.00 N	13.50
38	P & R Margin*(60%)*	45.62	46.31	46.84	0.01	0.00	0.00	0.00 N	54.16
39	Indtd. Net Stumpage	-17.26	-6.34	-6.80	0.00	0.00	0.00	0.00 A	-7.47
40	Indtd. Ad Rates	67.16	78.08	77.62	0.01	0.00	0.00	0.00 A	4668962.03
									76.95

APPRAISAL SUMMARY

Sale Name: STARFISH ALT. 3

Checked By: RCA

Date: JULY 24 1991

Spec. Rd. Const: 24.9 Miles Reconstruction 0.0 Miles Profit in Rds \$350,863.64
 \$6.79/MEF
 Product: App.to: Haul Temporary Road Const 2.5 Miles Purch.Crd.Lmt \$3,859,500.00
 1: Wrangell 7 Miles
 Ketchikan
 Base Year Data: AMEND. #87 ID #62 Temp.Road Cst \$265,000.00
 Adjusted To: 0 Quarter

1	Product/Unit	1-1	1-1	1-1	1-1				1
2	Volume Class	VC 4	VC 5	VC 6	VC 7				TOTAL/AVE.
3	Species Code								//////////
4	% by V.C.	9.8	45.0	45.1	0.0			T	100.0
5	Volume	5080	23270	23328	0	0	0	T	51,678
6	Sell Val(LT)							A	
7									
8									
9									
10	Selling Value LS	356.21	322.89	311.15	337.08	0.00	0.00	0.00 A	320.87
11	Felling & Bucking	41.85	31.84	27.01	20.57	0.00	0.00	0.00 A	30.64
12	Skid Load & Deprec.	154.02	121.41	111.08	62.40	0.00	0.00	0.00 A	119.95
13									
14	SUB. Stump to Truck	195.87	153.25	138.09	82.97	0.00	0.00	0.00	
15	Haul Dump Raft & Tow	27.42	27.54	27.62	27.78	0.00	0.00	0.00 A	27.56
16	Road Maintenance	2.68	2.68	2.68	0.01	0.00	0.00	0.00 A	2.68
17	SUB. Transportation	30.10	30.22	30.30	27.79	0.00	0.00	0.00	
18	Gen. Logging Ovrrhd	5.31	5.31	5.31	0.01	0.00	0.00	0.00 A	5.31
19									
20	SUB Administration	5.31	5.31	5.31	0.01	0.00	0.00	0.00	
21	Slash Disposal	0.00	0.00	0.00	0.01	0.00	0.00	0.00 A	0.00
22	Erosion Control	0.52	0.52	0.52	0.52	0.00	0.00	0.00 A	0.52
23	Snag Disposal	0.00	0.00	0.00	0.00	0.00	0.00	0.00 A	0.00
24									
25	SUB Envrnmntl. Prtc	0.52	0.52	0.52	0.53	0.00	0.00	0.00	
26	Temporary Roads	5.13	5.13	5.13	0.01	0.00	0.00	0.00 A	5.13
27	Other Temporary Dev	1.94	1.94	1.94	0.01	0.00	0.00	0.00 A	1.94
28	SUB Temporary Dev	7.07	7.07	7.07	0.01	0.00	0.00	0.00	
29	SUB Logging Costs	238.87	196.37	181.29	0.01	0.00	0.00	0.00 A	193.74
30	Specified Road Cost	74.68	74.68	74.68	0.01	0.00	0.00	0.00 A	74.68
31	TOTAL LOG COSTS	313.55	271.05	255.97	0.01	0.00	0.00	0.00 A	268.42
0	Manufacturing LT							A	
33									
34	Manufacturing LS	0.00	0.00	0.00	0.00	0.00	0.00	0.00 A	0.00
35	TOT PRODUCTION COST	313.55	271.05	255.97	0.01	0.00	0.00	0.00 A	268.42
36	CONVERSION	42.66	51.84	55.18	0.01	0.00	0.00	0.00 A	52.44
37	P & R Ratio	13.20	13.31	13.76	13.95	0.00	0.00	0.00 N	13.50
38	P & R Margin*(60%)*	46.15	46.84	47.37	0.01	0.00	0.00	0.00 N	53.80
39	Indtd. Net Stumpage	-3.49	5.00	7.81	0.00	0.00	0.00	0.00 A	5.43
40	Indtd. Ad Rates	71.19	79.68	82.49	0.01	0.00	0.00	0.00 A	80.11
								T	4140117.35

APPRAISAL SUMMARY

Sale Name: STARFISH ALT. 4

Checked By: RCA

Date: JULY 24 1991

Spec. Rd. Const: 21.4 Miles Reconstruction 0.0 Miles Profit in Rds \$287,927.27
 \$5.47/MBF
 Product: App.to: Haul Temporary Road Const 3.5 Miles Purch.Crd.Lmt \$3,167,200.00
 1: Wrangell 7 Miles
 - Sitka
 Base Year Data: ERR Temp.Road Cst \$371,000.00
 Adjusted To: 0 Quarter

1	Product/Unit	1-1	1-1	1-1	1-1				1
2	Volume Class	VC 4	VC 5	VC 6	VC 7				TOTAL/AVE.
3	Species Code								//////////
4	% by V.C.	10.7	49.9	39.4	0.0			T	100.0
5	Volume	5651	26224	20727	0	0	0	T	52,603
6	Sell Val(LT)							A	
7									
8									
9									
10	Selling Value LS	356.21	322.89	311.15	337.08	0.00	0.00	0.00 A	321.84
11	Felling & Bucking	41.85	31.84	27.01	20.57	0.00	0.00	0.00 A	31.01
12	Skid Load & Deprec.	153.69	119.55	109.56	62.40	0.00	0.00	0.00 A	119.28
13									
14	SUB. Stump to Truck	195.54	151.39	136.57	82.97	0.00	0.00	0.00	
15	Haul Dump Raft & Tow	27.43	27.54	27.63	27.79	0.00	0.00	0.00 A	27.56
16	Road Maintenance	2.68	2.68	2.68	0.01	0.00	0.00	0.00 A	2.68
17	SUB. Transportation	30.11	30.22	30.31	27.79	0.00	0.00	0.00	
18	Gen. Logging Ovrhd	5.31	5.31	5.31	0.01	0.00	0.00	0.00 A	5.31
19									
20	SUB Administration	5.31	5.31	5.31	0.01	0.00	0.00	0.00	
21	Slash Disposal	0.00	0.00	0.00	0.01	0.00	0.00	0.00 A	0.00
22	Erosion Control	0.52	0.52	0.52	0.52	0.00	0.00	0.00 A	0.52
23	Snag Disposal	0.00	0.00	0.00	0.00	0.00	0.00	0.00 A	0.00
24									
25	SUB Envrnmntl. Prtc	0.52	0.52	0.52	0.53	0.00	0.00	0.00	
26	Temporary Roads	7.05	7.05	7.05	0.01	0.00	0.00	0.00 A	7.05
27	Other Temporary Dev	1.90	1.90	1.90	0.01	0.00	0.00	0.00 A	1.90
28	SUB Temporary Dev	8.95	8.95	8.95	0.01	0.00	0.00	0.00	
29	SUB Logging Costs	240.43	196.40	181.65	0.01	0.00	0.00	0.00 A	195.32
30	Specified Road Cost	60.21	60.21	60.21	0.01	0.00	0.00	0.00 A	60.21
31	TOTAL LOG COSTS	300.64	256.61	241.86	0.01	0.00	0.00	0.00 A	255.53
0	Manufacturing LT							A	
33									
34	Manufacturing LS	0.00	0.00	0.00	0.00	0.00	0.00	0.00 A	0.00
35	TOT PRODUCTION COST	300.64	256.61	241.86	0.01	0.00	0.00	0.00 A	255.53
36	CONVERSION	55.57	66.28	69.29	0.01	0.00	0.00	0.00 A	66.32
37	P & R Ratio	13.20	13.31	13.76	13.95	0.00	0.00	0.00 N	13.47
38	P & R Margin*(60%)*	46.94	47.63	48.16	0.01	0.00	0.00	0.00 N	53.24
39	Indtd. Net Stumpage	8.63	18.65	21.13	0.00	0.00	0.00	0.00 A	18.55
40	Indtd. Ad Rates	68.84	78.86	81.34	0.01	0.00	0.00	0.00 A	78.76

Appendix G

**Monitoring
References**

APPENDIX G

ADDITIONAL MONITORING REFERENCES

Included in this appendix is information supplemental to the discussions of implementation and effectiveness monitoring of soil and water Best Management Practices (BMP's) found in Chapter 2. Two implementation monitoring forms, one each for timber harvest and road management activities, are provided first. Although thought to be complete, they may be subject to minor revisions as needed to enhance data collection and utilization. Following these forms is a draft outline showing some of the approaches being considered for the effectiveness monitoring of BMP's.

Date: _____ Sale Name: _____ Unit #: _____ 1/4 Quad: _____ VCU: _____ Road #: _____

Monitored by: _____ Aerial Photo: Yr: _____ Flt: _____ Photo #: _____

Stream Name: _____ Channel Type _____ ADF&G #: _____ NFS Watershed #: _____

Unit Release Date: _____ Harvest Date: _____ Acceptance Date: _____

Management Objectives: CS ___ PSP ___ ST ___ WQ ___ FP ___ LWD ___ TIO ___

BMP NUMBERS *	RATING	Phase Problem Occurred In						COMMENTS
		SE	EA	CT	LO	AD		
<u>Unit Layout & Design</u>								
13.2 Timber Harvest Unit Design								
13.5 Protection of Unstable Areas								
13.10 Log Landing Location & Design								
<u>Riparian Area Management</u>								
12.6 Riparian Area Designation & Protection								
12.7 Streambank Protection								
13.16 Stream Channel Protection								
<u>Timber Harvesting</u>								
13.7 Determining Suitability for Shovel Logging								
13.9 Suspended Log Yarding in Timber								
<u>Erosion Control</u>								
13.11 Erosion Prevention and Control								
13.14 Acceptance of Timber Sale Erosion Control Measures Before Sale Closure								
<u>Hazardous Materials</u>								
12.8 Oil Pollution Prevention and Servicing/Refueling Operations								
<u>Maintenance</u>								
14.20 Road Maintenance								

* Only high priority BMP's are listed. Site specific concerns may be addressed by adding appropriate BMP's on back of this form.

1/4 Quad: List name of USGS 1/4 Quadrangle that Unit can be located on.

Stream Name: Indicate formal USGS name, that the stream is a tributary to a formally named stream (Tributary to _____), or that this item is not applicable (NA). Stream must be associated to unit or within 200' of unit.

Acceptance Date: Date Forest Service accepted the road as being complete and agreed that the contractor met the obligations of the contract.

Unit Release Date: Date when the unit was released for harvest.

Harvest Completion Date: Date when yarding was completed.

Unit Card Objectives: Principal issues defined by unit card and fish habitat reports. Key to abbreviations are as follows:

- CS = Channel Stability

ST = Stream Temperature

FP = Fish Passage

TIO = Timing of Instream Operations
- PSP = Primary/Secondary Productivity

WQ = Water Quality Maintenance

LWD = Large Woody Debris Source

Implementation Rating

- 4 = Operation Exceeds BMP Requirements
- 3 = Operation Meets BMP Requirements (90% - 100% of Project Area Meets BMP)
- 2 = Minor Departure from BMP (75%-89% of Project Area Meets BMP)
- 1 = Major Departure From BMP (Less than 75% of Project Meets BMP)
- 0 = BMP Disregarded (Total Disregard of BMP Throughout Project Area)
- NC = BMP not complete at time of survey
- N/A = BMP not applicable

Phase in Which Problems Occurred

- SE = Site Evaluation Phase
- EA = Environmental Assessment or Environmental Impact Statement
- CT = Long Term Contract or Individual Sale Contract
- LO = Unit Layout Phase
- AD = Sale Administration Phase

Comments

- As a suggestion, comments may include:
- The number of acres of unstable area disturbed by management activities

- Implementation of site specific prescriptions

<u>Additional BMP's of Concern</u>							

Date: _____ Sale Name: _____ Unit #: _____ 1/4 Quad: _____ VCU: _____ Road #: _____

Monitored by: _____ Aerial Photo: Yr: _____ Flt: _____ Photo #: _____

Stream Name: _____ Channel Type _____ ADF&G #: _____ NFS Watershed #: _____

Unit Release Date: _____ Harvest Date: _____ Acceptance Date: _____

Management Objectives: CS__ PSP__ ST__ WQ__ FP__ LWD__ TIO__

BMP NUMBERS *	RATING	Phase Problem Occurred In						COMMENTS
		SE	EA	CT	LO	AD		
<u>Riparian Area Management</u>								
12.7 Streambank Protection								
14.13 Control of Const. in Riparian								
14.14 Control of In-Channel Operations								
14.15 Diversion of Flows Around Construction Sites								
14.16 Stream X-ings on Temp. Roads								
14.17 Bridge & Culvert Installation								
<u>Location and Design</u>								
14.2 Location of Transportation Facilities								
14.3 Design of Transportation Facilities								
14.4 Location and Design of Log Transfer Facilities								
<u>Erosion</u>								
14.5 Road & Trail Eros. Control Plan								
14.7 Slope Stabilization to Minimize Mass Failure								
14.8 Slope Stabilization to Minimize Surface Erosion								
14.12 Control of Excavation and Sidecast Materials								
14.25 Obliteration of Temp. Roads								
<u>Drainage</u>								
14.9 Control of Road Drainage								
<u>Hazardous Materials</u>								
12.8 Oil Pollution Prevention and Servicing/Refueling Operations								
<u>Maintenance</u>								
14.20 Road Maintenance								

* Only high priority BMP's are listed. Site specific concerns may be addressed by adding appropriate BMP's to the back of this form.

1/4 Quad: List name of USGS 1/4 Quadrangle that Unit can be located on.

Stream Name: Indicate formal USGS name, that the stream is a tributary to a formally named stream (Tributary to _____), or that this item is not applicable (NA). Stream must be associated to unit or within 200' of unit.

Acceptance Date: Date Forest Service accepted the road as being complete and agreed that the contractor met the obligations of the contract.

Unit Release Date: Date when the unit was released for harvest.

Harvest Completion Date: Date when yarding was completed.

Unit Card Objectives: Principal issues defined by unit card and fish habitat reports. Key to abbreviations are as follows:

CS = Channel Stability	PSP = Primary/Secondary Productivity
ST = Stream Temperature	WQ = Water Quality Maintenance
FP = Fish Passage	LWD = Large Woody Debris Source
TIO = Timing of Instream Operations	

Implementation Rating

4 = Operation Exceeds BMP Requirements
3 = Operation Meets BMP Requirements (90% - 100% of Project Area Meets BMP)
2 = Minor Departure from BMP (75%-89% of Project Area Meets BMP)
1 = Major Departure From BMP (Less than 75% of Project Meets BMP)
0 = BMP Disregarded (Total Disregard of BMP Throughout Project Area)
NC = BMP not complete at time of survey
N/A = BMP not applicable

Phase in Which Problems Occurred

SE = Site Evaluation Phase
EA = Environmental Assessment or Environmental Impact Statement
CT = Long Term Contract or Individual Sale Contract
LO = Unit Layout Phase
AD = Sale Administration Phase

Comments

As a suggestion, comments may include:

- The number of acres of unstable area disturbed by management activities
- Implementation of site specific prescriptions

Additional BMP's of Concern

SOIL AND WATER
BMP EFFECTIVENESS MONITORING
DRAFT OUTLINE

The following introductory outline portrays the current ideas watershed managers on the Tongass National Forest are considering when addressing the issues and concerns of soil and water resource monitoring. These ideas will be presented more fully in the currently developing, Forest-wide Effectiveness Monitoring Plan. Note that this outline is only a draft format and is subject to change.

I. Some Principal Questions

- A. How effective are Stream Class I and II stream/riparian management zones (SMZ)?
- B. How effective are Class III stream/riparian management zones?
- C. How do road erosion and road drainage affect sedimentation?
- D. What are the cumulative watershed effects from management activities?

These are broad, topical questions from which specific problem statements might be developed. These questions are discussed in greater detail in the following sections.

In the following questions, reference is made to streamside management zones, or SMZ's. For clarification, we have defined streamside management zones as the riparian zone or the aquatic/terrestrial zone of interaction. Additionally, the recently mandated 100ft buffer zone of Class I and II streams, which may often extend beyond the riparian zone, is included. The width of the streamside management/riparian zone will be a function of channel type (See Watershed and Fisheries sections of Chapter 3 of this FEIS).

II. How effective are Class I and II SMZ's?

- A. What is the relationship between buffer strip design and buffer strip stability?
- B. How effective is the design of the buffer in protecting the streambank and channel integrity from windthrow events?
- C. How do the type and distribution of stream habitat morphologic units compare between buffered and natural reaches?
- D. How does Large Organic Debris (LOD) frequency and distribution compare between buffered and natural reaches?
- E. What is the frequency and magnitude of bank disturbance associated with blowdown in buffered stream reaches compared with natural reaches

III. How effective are Class III SMZs?

The principal concerns, in Class III SMZ's, are mechanisms of sediment and LOD input and subsequent transport. The effectiveness monitoring questions asked here closely relate to cumulative watershed effects.

A. How does the percent area disturbed (on v-notch sideslopes or streambanks) vary between Class III streams with leave strips and Class III streams without leave strips?

1. Area disturbed is being defined as the areas of bare mineral soil exposed immediately adjacent, and available, to the stream course. The area of disturbance must be able to deliver sediment to the stream during flood events, or where bankfull is exceeded.

B. How do different yarding systems affect percent area disturbed on Class III v-notch sideslopes or streambanks?

C. How does the amount of LOD compare between buffered and harvested Class III streams

IV. What are the effects of road erosion and drainage on sedimentation?

A. How does sedimentation change, in streams associated with roads, during construction?

B. How does sedimentation change in streams, with continued use of the road during logging?

1. The samples could be stratified on the basis of season.

V. What are some Cumulative Watershed Effects from management activities?

The principal issues of concern under this topic are sedimentation, changes in streamflow and temperature changes.

A. How does the temperature regime of Class I streams compare between harvested and unharvested watersheds?

1. Samples could be stratified on the basis of percent harvest in the watershed.

B. How does frequency, magnitude, and duration of peak and low flows, in Class I streams, compare between harvested and unharvested watersheds?

1. Samples could be stratified on the basis of percent harvest in the watershed.

C. How does sedimentation vary with differing percentages of the watershed harvested, in Class I streams?

